The 'Home Garden' Books

GLADIOLI

By

A. J. MACSELF

4 COLOUR PLATES
8 HALF-TONE PLATES

NUMEROUS DRAWINGS
IN THE TEXT

WHAT THIS BOOK IS ABOUT ☛

GLADIOLI

By

A. J. MACSELF

Britain, America and the Continent of Europe are alike lionizing the gorgeous and impressive flowers of 20th Century Gladioli, for not only have untiring plant-breeders raised new varieties of exquisite form and colour, but they have evolved new races entirely distinct from any flower the world has before known, and on both sides of the Atlantic enthusiasm for this cherished favourite among flowers has reached fever heat. Professional and Amateur gardeners alike are eagerly seeking information about the flower, and it is in response to many direct personal appeals that Mr. Macself has occupied his busy pen in producing *Gladioli*, a work which deals with all phases of the culture and utility of the several sections of this great family. The book includes nothing superfluous, omits nothing which is essential to meet the requirements of the novice, the enthusiast, the exhibitor, and the commercial grower

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A TRIO OF CHOICE "LANGPRIM" HYBRIDS (KELWAY)

GLADIOLI

By

A. J. MACSELF
Founder and First Chairman of the
National Hardy Plant Society

Illustrated by colour and
half-tone photographs and
by line drawings

NEW YORK
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PREFACE

BOOKS which mention and briefly describe Gladioli are to be counted by the score. Well-nigh every handbook on flower gardening includes paragraphs telling when to plant Gladioli, and what to do with the corms in winter.

It is frequently proclaimed that this is the age of specialization, and the observant eye cannot fail to note the particular interest that centres to-day in the cult of the gladiolus. Enthusiasts among amateurs are making much of the flower, and as a natural sequence commercial horticulturists are directing special attention to Gladioli, for the trade in corms has increased to a remarkable extent, and is apparently assured of still greater development.

The appeal has been heard for fuller information upon matters concerning the culture of Gladioli, the production of stock, and various other points of interest.

That appeal came my way, and this book is

my response. Those to whom Gladioli are of no special concern will pass it by without a second thought, but among those who are planting the millions—and it is millions—of imported as well as British grown corms may be some who will find interest and practical help in the perusal of its pages.

The Gladiolus is but a single genus in the world of flowers, but it is a growing family, and its members are endowed with varied charms which make the family worthy of widespread and sustained popularity.

Modern developments have considerably enhanced the importance and serviceability of gladioli, and there would be no justification for the assumption that even the great strides of recent years have brought the genus within measurable distance of finality to its progress.

If the result of my task is to help this glorious flower even a short step along its road of progress my desire will be gratified.

A. J. M.

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GLADIOLI

CHAPTER I

THE GLADIOLUS OF THE PAST

THE Gladiolus was first introduced to Britain in 1596, the same year as that in which the first Cyclamen and the Tomato came to us, truly an important year in its relation to modern horticulture.

Of the many species of the genus Gladiolus the majority are South African plants, but some are to be found in various parts of Asia, and one, at any rate — Gladiolus communis — in Southern Europe.

So far as practical horticulture is concerned there is not much cause to linger over the year of introduction or the early culture of Gladioli in this country. We of to-day see but little of original species, for the vast majority of Gladioli grown in British gardens are hybrids of considerably mixed parentage, and we shall find more of

direct practical interest in studying the developments in this direction which belong to the nineteenth century rather than earlier times.

Gladiolus cardinalis was mentioned by Richard Anthony Salisbury, when he read his remarkably interesting papers on "The Cultivation of Rare Plants" at three meetings of the Royal Horticultural Society on January 6, February 4 and March 3, 1812; and it is apparent from the remarks made by so well informed a plantsman that this particular species was then quite among the uncommon plants; for he says: "I believe that this fine plant will succeed much better in the open border under any warm wall than in a pot; for it has lived one winter in my court, which is not a favourable situation, and in a pot it requires a great deal of water, till the leaves decay." The last sentence reveals a keen observation which many cultivators of more recent times have lacked, for to my knowledge many a batch of pot-grown Gladioli has been ruined by leaving the growth to dry off as soon as the flower spikes were cut. I, too, believe that Gladioli are really better planted out than potted, but they may be very successfully grown in pots if treated with reasonable care. Cultural

details are however matter for a later chapter.

In Robert Sweet's *British Flower Garden*, 1833, a fine coloured plate of Gladiolus pudibundus is given, showing a rather irregular spike carrying seven open flowers of similar outline to G. cardinalis. The colour is rose pink, three of the petals having a white blotch which is margined with carmine-crimson.

The accompanying note mentions that "This is a hybrid offspring, we believe, between Gladiolus cardinalis and blandus, and was raised by the Honourable and Rev. William Herbert. . . . It is an extremely showy plant, and therefore cannot fail to become an universal favourite with florists. It will doubtless require the same treatment as G. cardinalis, and, like it, readily increased by offsets."

Only one note on Gladiolus appears in the whole year's volume of *The Floricultural Cabinet* for 1834, and this is from a correspondent who relates that he procured three roots of Gladiolus psittacina, and had succeeded in securing a flower spike from one of them. This he describes as "a very superb one indeed, having twelve blossoms on one stalk; a more beautiful Gladiolus I never beheld."

The writer furthermore expresses great surprise that when he lifted the roots, instead of the three he had planted he found five, and an extraordinary number of small young bulbs some the size of hazel nuts, as many more the size of peas, and above 600 the size of grains of wheat. He raises the query as to whether something extraordinary has occurred.

Under date of December 23, 1835, "A Constant Reader" of *The Floricultural Cabinet* writes: "I shall feel obliged if you or any of your correspondents will inform me of the names of a few of the leading sorts of Gladioluses to flower in the greenhouse in pots; with their proper treatment, time of potting, etc., etc. An early answer will greatly oblige." I have hunted diligently, but have failed to find a reply to that inquiry. Whether that means that its note of urgency resulted in the information being sent direct to the constant reader, or that no willing expert was forthcoming with the names and instructions required I do not know, but these few notes, while they make no pretence at furnishing a history of the cultivation of the Gladiolus in Britain may, I think, be taken as very fair evidence that at any rate up to 1835 there

were but few growers, and but a small number of kinds or varieties in cultivation.

It is nevertheless interesting to note that at least one hybrid variety is mentioned and well illustrated in Sweet's work, published nearly a century ago, and it was not long after that when Gladioli began to figure prominently in books, and in trade catalogues.

The breeding of inter-crossed varieties was taken up with great zeal in France before British raisers got seriously to work, the Lemoinei hybrids being perhaps the most notable achievement of continental raisers, although some very good early flowering varieties were raised in France by crossing G. cardinalis with G. floribundus, G. nanus, and G. tristis, these latter being dwarf, small, and slender in growth, but introducing distinctive colour markings.

Among the species which helped to build up the large-flowered and later flowering Gladioli to-day, G. psittacina, already referred to, was one. Its flowers were sufficiently bright and distinct to attract considerable attention, and it was strong enough to exert an unmistakable influence on the progeny of its crosses. Scarlet outside, with a yellow interior, G. psittacina

obviously helped materially in the production of the yellow throated race of hybrids which originally came to us from France, but it is also reputed to have been one of the parents of the Gandavensis hybrids which derived their name from Ghent, whence they were distributed. Cassell's *Dictionary of Gardening* informs us that G. gandavensis is understood to have been raised from G. psittacinus crossed with G. cardinalis, though Dean Herbert concluded that G. oppositiflorus was used instead of G. cardinalis, and Mr. Burrell, one of the leading British experts, supported that view.

M. Lemoine of Nancy, originator of the Lemoinei hybrids, used G. purpureus-auratus to cross with Gandavensis and other varieties. The Lemoinei hybrids have been remarkable for rich, sharply defined blotches which display themselves conspicuously on the lower segments, and it is from this group also that varieties leaning toward blue and purple have been evolved. M. Lemoine was also the father of the Nanceianus group, which *Cassell's Dictionary* tells us were the produce of intercrosses between Lemoinei and Gandavensis varieties. Thus we find that even at the outset our finest races of Florists' Gladioli are of very

mixed blood rather than the progeny of direct crosses between distinct species.

The Nanceianus hybrids are a particularly fine race throwing tall spikes, well furnished with large widely expanding blossoms.

Herr Max. Leichtlin of Baden Baden was the originator of the Childsii group, but prior to general distribution the stock was purchased by an American grower named Childs.

G. Saundersii, a late-flowering highly-coloured species, was used for crossing with Gandavensis varieties. The hybrids of this section are remarkable for the breadth of their flowers, and Childsii blood is evident in some of the quite recent American introductions, the bells of which are of giant proportions.

Wright's Flower Growers' Guide credits G. Saundersii with a share in the parentage of G. nanceianus as well as G. Childsii, and it is quite probable that most of the principal species and the progeny of first crosses were used to some extent in the building up of all the groups or races of the modern Gladiolus.

A species which is less frequently mentioned than its merits would appear to deserve is G. ramosus, of South African origin. It is remark-

able for colour variations, and is a prolific producer of young corms. G. ramosus flowers between July and October according to situation and time of planting.

G. cruentus, from Natal, introduced useful colour, its flowers being scarlet with white blotches and stripes. It is dwarf, and very late flowering.

It would be retailing quite familiar information to dwell at length upon the notable achievements of our own prominent specialists in Gladioli, but tribute must always be paid to the illustrious firm of Kelway & Son, whose "Kelwayi" race embraces all the finest attributes of the whole tribe of Gladioli. The late Mr. J. Burrell, of Howe House Nurseries, Cambridge, bred a superb collection which, happily, still remains in the hands of his successor, Mr. Ernest Doncaster, a florist of rare talent and enthusiasm.

To-day the number of British Gladiolus specialists is large, and with many American breeders also in the field, the future of the Gladiolus is radiant with rosy prospects.

CHAPTER II

MODERN DEVELOPMENTS OF THE GLADIOLUS

UNLIKE breeders of thoroughbred horses, cattle, and dogs, the majority of plant breeders of last century made innumerable crosses, not so much with a definite idea of working toward a specific end as with an optimistic hope that something good would turn up. Many made no particular effort to retain records of the crosses they made, and those who did, rarely disbursed information upon the subject, consequently pedigrees of many good garden plants are so hazy that their practical value is small.

Gladiolus breeders had abundant material to work upon, and what were once well defined species, and classes or strains of distinctive characteristics were crossed and intercrossed to such an extent that the lines of demarcation have become well-nigh obliterated, and it would be a

difficult matter to allocate some of the finest varieties to any particular class.

For ordinary purposes of garden culture it may be held that this is a matter of trifling importance, and that so long as good and desirable varieties are produced it matters little or nothing whether they should be called Gandavensis hybrids, seedlings, or any other fanciful name, but with that view I disagree. There is always some value in accurate information, and it would be of great service to-day if access could be obtained to clear details of the breeding or pedigree of the various large-flowered Gladioli in cultivation. In only a few select strains is that information available.

The most impressive modern development in Gladioli is the evolution of an entirely distinct race of hybrids between Gladiolus primulinus and large-flowered varieties.

This is entirely a production of this century, for Gladiolus primulinus came to this country in 1903, when Mr. Francis Fox, of the famous firm of architects who built the bridge at the Zambezi Falls sent it over to Messrs. Kelway & Son, Langport, who have been so long famous as specialists in Gladioli.

The typical Gladiolus primulinus is a very

MASSED PRODUCTION OF GLADIOLI ON THE NURSERIES OF MESSRS. KELWAY & SON, LANGPORT

dainty little plant, slender and graceful in all its parts. The stems are thin, arching, and inclined to produce lateral branches. Four feet is about the average height of a mature plant, and along the stems are distributed comparatively small blossoms of a clear and very pure shade of yellow. The blossoms are poised at an angle which gives them almost a drooping appearance which is accentuated by a marked forward curve of the top petal, forming what may aptly be called a "hooded" flower.

I may be permitted to quote from Messrs. Kelway's Manual an extract of the expressed opinion of the Kew authorities, who wrote concerning G. primulinus: "From a horticultural point of view it seems to us quite unique, and a brilliant discovery. It ought to be the starting point of a new race of garden Gladiolus." That was encouraging prophecy, and as might be assured Messrs. Kelway lost no time in putting it to the test, with the result that they have brought about a glorious fulfilment of the prophecy and the "Lang-Prim" race, as their particular strain of hybrids is called, is one of the greatest horticultural triumphs of this century.

Many other raisers have since taken up the

work of crossing this elegant species with the various large-flowered tribes, and thus several different types of Primulinus hybrids are already in commerce.

The first appreciable rewards of labour in this direction were acquisitions of entirely new colours, and of flower spikes so elegant and graceful as to open up new purposes to which Gladioli could be put. The fusion of yellow and red produced some most delightful shades of orange, apricot, flame, and shrimp-pink, generally with a yellow ground colour.

The size of flower in the earliest of the new hybrids was little if any larger than that of the Primulinus type. The same narrow tubular throat and curving hood-petal was maintained together with the wider interval between the bells or pips, whichever they may be called, and the graceful poise of the flowers on the stem. That, indeed, is exactly what could be most desired, for we had already a magnificent array of noble large-flowered varieties, and here we acquired a totally distinct and altogether new kind of flower.

Rarely, however, can human nature long suppress the innate admiration and worship of that which is large, and it was bound to happen

that efforts would be made to increase the size of the flowers of Primulinus hybrids. Those efforts also have achieved results. Up to a certain point we may commend the "improvement" in size, but it is highly desirable that this point should not go far enough to mar in the slightest degree the daintiness and distinctive form of so exclusive a flower.

We have already varieties with blooms so much larger than the type that an effort at classification has been made and the new name of "Medio-Prims" has been used to distinguish those which are too large to retain the original designation.

Some varieties of this section are delightful, and indeed extremely fine, but I do sincerely hope —and I know that in this many keen admirers of these and all other Gladioli agree—that raisers will be satisfied with the advancement already made, and will not pursue further efforts after mere size.

The danger to be feared is that such pursuit would succeed only at the sacrifice of the superb grace and elegance of form which it should be the main object to preserve. That this danger is real is evidenced by the fact that a few varieties are already in cultivation which have almost erect top petals and widespread wing petals.

Thus, by infusing too great a proportion of the blood of the older types, instead of producing something new which is better, we merely travel the beaten track of reproduction of the large-flowered Gladiolus, a flower which already exists in profusion and a high standard of perfection.

Let us remember our first elation at the sight of the new Gladiolus of fairy-like daintiness which gave the genus an entirely new sphere of utility as a flower for artistic decoration. That is the chief, the most valuable feature of the Primulinus tribe, and that invaluable attribute should be jealously guarded and preserved.

It would be well to formulate a standard for the guidance of raisers, and judges, and exhibitors, for unless a clearly defined ideal is set up there is little hope of steering clear of pitfalls.

It would be arrogant presumption on my part to outline or lay down a standard and thrust it forward in peremptory manner declaring it to be "THE STANDARD." Such is no one man's task, but must be the outcome of careful consideration and discussion by raisers and experts in conference. The extent to which I may permit myself to go is to enumerate points that should be kept in view, and to describe various features that

make for the preservation of distinctive character.

There will be little disagreement with the view that a slender, wiry, gracefully tapering stem is essential. A thick, broad stem to support

EXTREMES IN "BUILD" OF PRIMULINUS HYBRIDS.

Left-hand spike too thin; right-hand crowded, compare with photographic illustration of "Good Form" in G. primulinus hybrids.

small elegant flowers cannot be accepted as correct. A branching habit should be well worth encouraging, and some attention should also be paid to slenderness and grace of foliage. The

arrangement of bells or pips on the stem is of importance, for here we touch a point which has a marked effect upon the whole appearance of the flower spike. The precise length of intervals between the blossoms must depend upon the size of the individual flowers. It should be of sufficient length to prevent a petal of one blossom touching another, otherwise heaviness or lumpiness is inevitable. On the other hand intervals of too great a length may produce an effect of paucity or skimpiness. Some extremely elegant spikes show almost an equality between the spread of a blossom and the space between it and its neighbour. Length of intervals may be affected to a considerable extent by culture, but there are varieties which persistently show too much or too little intermediary stalk.

The shape and size of the individual flower is the debatable point. The hooded top petal is too precious to sacrifice, but to what extent should it arch forward? There are many varieties which are hooded to such an extent that the interior of the bloom is quite concealed from view. The exterior colour of such petals is usually pleasing, but the interior of a Gladiolus flower is often even prettier than the outside,

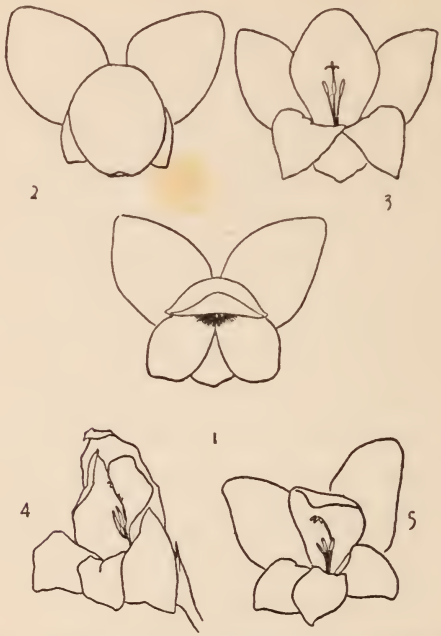
MODERN LARGE-FLOWERED GLADIOLI

and even though it savours of greediness I must confess to a desire to see both. A recurving margin to the hooded petal serves in many varieties to just sufficiently expose the throat of the blossom, and the graceful curve to my mind adds to the charm and elegance of the flower.

The length of footstalk requires observation. If of too great a length the bell invariably hangs at too broad an angle from the stem, while a very short footstalk holds the blossom erect and stiff, giving the spike a cramped and somewhat inelegant appearance. Colour is too intricate a subject to permit of dictatorial assertions, and so long as the colours are pleasing in tone and arrangement nothing more is really essential. We have passed the days when blotches must be outlined with the precision of the draughtsman's compass, but a certain balance in any contrasting markings is always desirable.

In the accompanying group of illustrations of Primulinus forms the artist has shown variations which actual specimens display. Whether one of these should be taken as the ideal is not for me to say, but one or two may surely be voted inferior and undesirable. The flower numbered 4 that has so narrow a tube that it presents a

"pinched" appearance cannot be a fine flower, but of all defects the greatest is No. 3 with its approach to Gandavensis or Brenchleyensis form, and sacrifice of the graceful wave and



OUTLINE OF "BELLS" OF VARIOUS SEEDLINGS OF THE PRIMULINUS CLASS.
See comments.

curl of petals which is the distinctive feature of the Primulinus type.

No. 2 shows the excessive droop of top petal, and No. 5 will surely be generally condemned as lacking any desirable refinement of form.

No. 1 shows the recurving tip of the hooded petal just permitting a glimpse of the interior of the flower.

A Surmise of Future Developments

What, then, are the prospects of the future for this class, and on what lines may further development be expected and desired? It may be confidently asserted that both for garden adornment and for cut-flower decorations the Primulinus hybrids are assured a foremost position. Even the knowledge that one or two leading growers for Covent Garden experienced disappointments when they submitted large consignments to the test of the market does not shake my firm conviction that ere long every floral artist will eagerly seek Gladiolus primulinus and its progeny. It must be borne in mind that first consignments came as strangers to the market. The salesmen were unfamiliar with the new flowers, the buyers were not expecting them, and were not prepared for them, nor were conditions of trade at the time such that speculative investment in something new was an attractive proposition. Even the growers, capable and progressive as we know them to be, had no

definite data to guide them, and in their first consignments, grown from continental stock, were varieties which might or might not be the best inducement to buyers to give them a trial. That these contentions are not idle excuses is evidenced by the fact that since the experiments above referred to, a grower of the best exhibition varieties was persuaded to send a consignment of some half-dozen distinct and good colours to a stallholder in the flower market, and although at the time large-flowered Gladioli were making absurdly low prices the Primulinus sold readily at treble the money and eager inquiries for more were daily received right through to the very end of the season. That grower has a definite arrangement with his salesman for large productions, but the kinds and colours are based on the experience of his successful experiment. Those who know the market best will appreciate the need for careful discrimination in the selection of varieties, and will also be least surprised at the slight attention paid to first efforts. In the big markets of the midlands and the north the welcome of the Primulinus hybrids was more prompt than in London, and several growers of my acquaintance have found them a most serviceable line.

For the purpose of garden adornment the new race cannot be too highly praised. The facts that many of the prettiest kinds have a freely branching habit, and that most will throw more than one good spike from a well developed corm are points of great importance. The colours, too, are pleasing and effective from a distance as well as when subjected to close inspection, and many shades available in the Primulinus hybrids are unique not only in the genus but in the whole of Flora's realm. The length of the flowering season is another important factor in this connection, for it is possible to have a continuous succession of flowers from the opening days of July right through August and September and into October, whilst signs are not wanting that early varieties will be forthcoming which may be had in bloom, at any rate in southern gardens, as early as the first half of June.

To the exhibitor the Primulinus race will prove an immense boon, facilitating delightfully artistic arrangement in groups of Gladioli, and providing valuable items for displays of a miscellaneous character.

Future developments are certain to be of great

importance and interest. Further increase in size, as has already been urged, is the least desirable direction for effort to take, but it will be very delightful to welcome pure whites, pinks, crimsons, lavenders, and purples in the true form of Primulinus. Messrs. Kelway & Son have already given us some rich and distinct colours in Crimson King, Red Robin, and Rev. J. Stubbs, the latter as bright as the old favourite G. brenchleyensis, whilst Peach Blossom is quite a rosy pink, and Enid Chamberlain is almost a white with a vividly contrasting crimson spot. With these departures already accomplished we may anticipate the achievement of the colour counterparts of Baron Hulot, America, L'Immaculée and other outstanding favourites as well as an extension of entirely new colours and combinations specimens of which the new race has already given with a liberal hand.

Possibly a fresh break may still be within reach as a result of crossing the Primulinus section with the small-flowered early section, G. floribundus, G. colvillei, and other species. It would be grand to have dwarf, early-flowering Gladioli in the chaste colours of Alice Tiplady, Souvenir, and Salmonea.

"BUTTERFLY" BLOTCHES OF RICH VELVETY LUSTRE ON A CLEAN GROUND
A notable feature of many "Kelwayi" varieties

Our small, early-flowering Gladioli have been the least progressive branch of the family. "The Bride," because it is a white flower, is grown in considerable quantities, but it cannot really be highly commended for fine form and pleasing character. What might be the outcome of a cross or series of crosses between this and some of the dapper little Primulinus varieties we cannot say, but there is greater chance of producing something better than G. colvillei alba than of losing ground in the attempt.

Many efforts have been made to produce new early-flowering varieties by means of the old crosses between G. cardinalis, concolor, blandus, nanus, and floribundus, but pace has been slow. Surely it is worth while to break fresh ground, and give the extremely promising scheme a trial of infusing Primulinus blood into the smaller group. Even G. cardinalis, prolific parent as it has been, may surpass itself in this new channel.

So far as the future development of the large-flowered tribe is concerned it may be held that the present pace of progress is rapid enough, and even that there is little to complain of if further progress is made but slowly. Do not let us too

readily agree to this suggestion, for it is not solely the rapid multiplication of new names that means progress. We have, it is true, an ample range of colours, and an abundance of names to select from, but there are varieties which are retained because of colour, which lack something in refinement, placement of blossoms upon the spike, and other points that may be embraced in the one word "quality." To be perfectly candid, when one contemplates the beautiful symmetry of the spike depicted in the illustration from an old photograph of a Scotch exhibition gladiolus it cannot be claimed that we have yet attained a much higher standard. The aim should be to produce new varieties of these particular colours but of greater refinement and finer build, and as these are secured the faulty ones should be discarded. Elimination of the inferior is part of the work of progress that should keep pace with the production of novelties.

It is on these lines we must proceed, for it is impossible to put the brake on progress and endeavour to stand still; when forward movement stops retrogression must begin. There is a good deal to be done in the way of classification

and grouping. Some varieties bloom much earlier than others, some are particularly late. Much advantage will accrue when the outstanding characteristics of such distinct varieties can be plainly indicated for the information of the prospective planter. Cleaner blues, good lavenders, pure whites, rich yellows are still none too plentiful, and the day is far off when we need cry halt to those who are working on the advancement of Gladioli and not merely lengthening catalogue lists.

CHAPTER III

EARLY-FLOWERING GLADIOLI

SEVERAL species and a number of prettily coloured hybrids of these species are grouped together under the heading "Early-flowering Gladioli." They are small by comparison with the later-flowering kinds, and their short, slender spikes rarely carry more than three or perhaps four open flowers. Still, there is beauty in the colouring and markings of the best varieties, and in form they are dainty and elegant. A few market growers force considerable quantities, but it must be confessed that the early-flowering Gladioli enjoy but a fraction of the popularity which belongs to the other members of the family, and neither commercially nor privately are they grown in this country to the extent they are in France, Holland, and other continental countries. The truth is these small varieties are seldom well grown, and a considerable proportion of the corms that are planted or potted fail to produce credit-

able flowers. There are reasons which explain the cause of the majority of these failures. In the first place there is room for much improvement in the manner of planting the corms.

Most books recommend planting in November, which is too late, the second and third weeks in October being the proper time, enabling the corms to throw out new roots before the earth arrives at winter temperature. A rooted corm will endure much wet with impunity; one which cannot issue roots because the soil is too cold will suffer badly from excessive moisture, and will very likely rot.

The knowledge that Gladioli are natives of Africa induces the belief that in order to make the corms as secure as possible, and to prevent the tips of young growth peeping through the soil too early in the spring it is necessary to plant deeply. Thus the advice to plant in November is supplemented with the remark that they should be planted 4 inches deep. I recently saw an article which urged that for safety the corms should be planted 5 inches deep. There is no safety in planting at such a depth, but there is a great deal of risk. Let it be borne in mind that at 5 inches the corms are not secure from frost, but are deep enough to be very cold and wet,

and to make the journey of the young growths to the surface and to daylight a lengthy, slow and difficult task. A far better plan, and one that I recommend after practising it with consistently good results, is to plant in the middle of October, not more than 3 inches deep, surrounding the corms with sand, and then, at the first approach of severe weather, cover the beds with loose, dry material. I do not agree with thick mulches of manure, for if one turns over such a mulch after it has been well soaked with rain one finds the soil in an unhealthy, slimy state which denotes lack of air movement. Adopt the method recommended for protecting spawn-beds, using loose brushwood to hold the closer material off the soil.

Under such treatment, and with thoroughly well prepared soil (not freshly manured), a bed of early-flowering Gladioli will come through a severe winter with scarcely a 1-per-cent. death rate, and will make strong healthy growth in spring which, with judicious feeding, will produce a capital display of bloom.

It is important to secure healthy stock, for unfortunately some imported corms are not free from disease. There is no valid reason why

GLADIOLUS "THE BRIDE"
(Early Flowering Section.)

EXHIBITION FORM IN ACCORDANCE WITH SCOTTISH IDEALS
From a photograph by courtesy of Messrs. Dobbie & Co. Edinburgh.

clean healthy stock should not be produced in Britain, and doubtless if the culture of early-flowering varieties makes strides of progress as it should do, our commercial growers will rise to the occasion and quickly meet the demand for stock.

Of the species the principal are Gladiolus blandus, growing about 1½ feet high, and flowering in June, and of which the colours are white, red, and yellow. G. byzantinus, red with purple markings, producing flower spikes about 2 feet long, also flowering in June. G. cardinalis, bright scarlet, rather taller and later than the foregoing, but the parent of some very useful hybrids. G. communis is dwarf, early, rosy pink, and is one of the few species to be found wild in Europe. G. floribundus is another dwarf species, the flower spikes scarcely exceeding 1 foot in length. There are flesh pink, red and white forms in this species, and several named garden varieties and hybrids which rank among the prettiest of the early-flowering section.

G. colvillei is of hybrid origin, its parents being G. concolor (seed parent) and G. cardinalis (pollen parent). Its flowers are scarlet, bordering on to crimson, with clean-cut blotches of

white. A pure white variety of Colvillei, named "The Bride," is the most popular commercial variety of the early-flowering section, being ex-

EARLY FLOWERING GLADIOLI.
1. Peach Blossom. 2. The Bride. 3. Colvillei.

tensively grown under glass for such purposes as wreath-making. Hybrids between G. colvillei and other of the species mentioned include

such pretty varieties as the well-known Peach-blossom, Blushing Bride, and Cramoise supérieur.

There would appear to be wide scope for the further development of this section of Gladioli, for the several species offer excellent opportunities for intercrossing, and if, as already suggested, the charming colours and graceful form of the Primulinus tribe could be blended with the other qualities of these already pleasing little flowers, we might develop still another race that will add much to the great value of a wonderful family. We may glory in the giants, but do not let us so entirely concentrate attention upon great size that we lose the power of appreciating the particular forms of beauty that belong to small flowers. The desire undoubtedly exists for early blooms of Gladioli, for large numbers are forced, to hasten them into bloom, and quantities are imported from the South of France because they bloom earlier there than with us. Surely it will be well worth persevering effort to produce a race that will naturally bloom several weeks earlier in our gardens.

CHAPTER IV

GENERAL CULTURE OF GLADIOLI

IN some of the old florists' handbooks this theme was dealt with by enthusiasts of the day, and very elaborate instructions were laid down, chiefly concerning the proper soil in which Gladioli should be grown, and methods by which that soil should be prepared for planting.

We have made a good deal of progress in horticulture since then, and have learned that in some matters rather more importance was placed upon certain points than was really necessary. There is, however, good ground for raising the query, "Do we, in reality, treat too lightly some of the lessons handed down to us by the old school of plantsmen?" They had an infinite capacity for taking pains, and living in a more leisurely age they spent much time over details. We, to-day, are tuned up to a more rapid pace, and of necessity dispense with that which we consider unessential. The point

we have to be careful about is to ensure that whatever we dispense with is proved to be unessential, and that we are not too greatly obsessed with the idea that the only necessity is to save time.

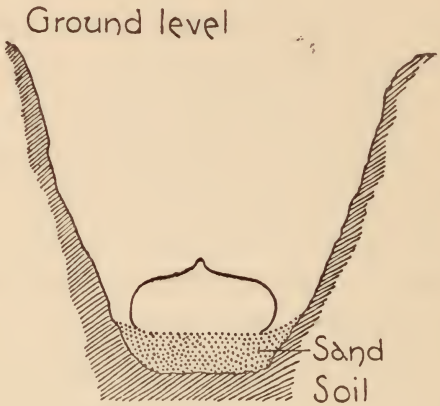
The one thing I am disposed to treat with more or less indifference is the habitual declarations of the old writers that this plant or that must have soil of a particular character. Were their prescribed soils alone capable of growing plants only a very small proportion of gardens could keep alive half the kinds of plants we find in them. We have acquired a greater knowledge of soil treatment, and are able by fairly simple means to convert naturally unsuitable soils into tolerably good soil, and thus many a barren waste and unfertile plot has been turned into a fertile garden. I find myself in agreement with the old writers when they urge that preparation of the soil for Gladioli should commence long in advance of the time of planting. The autumn is frequently mentioned as the time for digging and manuring the ground, and to my mind it is of immense advantage to begin as early as August. My reason for this is that whilst Gladioli require a very

well nourished soil, they are not at all fond of fresh manure. The old plan was, and still is, so far as many growers are concerned, to dig in manure in September or October, and leave the ground vacant until planting time in spring. This, admittedly, is infinitely better than digging and manuring just before planting time. I have, however, a confirmed objection to burying costly manure in autumn, and leaving it to be exhausted by rain dilution of its properties and by weeds which, even before planting time, will feed ravenously on enriched soil or rather on the soluble plant food formed from the manure in the soil. Instead of following this method, let me urge that the manure be dug into the ground in August. As soon as the surface can be raked down sow the whole area thickly with either cheap annual Lupin seed, Tares, or a cheap sample of Mustard seed. The seedlings will grow quickly, and take up the plant food from the manure as it becomes soluble. By the time the crop attains a height of about 6 inches the whole should be dug in, thus returning to the soil the nourishment taken up, and also adding considerably to the humus. Leave the surface in a rough state at this digging, and by

spring the soil will be in a sweetened, well-nourished state, but free from actual solids of manure. That is precisely the condition best calculated to successfully grow first-class Gladioli. The kind of manure should really be governed by the character of the soil, but in view of the difficulty of getting at all times just what is preferred it may be remarked that by adopting the plan suggested almost any manure may be used on almost any soil. Personally I would have no objection to using pig manure on clay soil when a crop of mustard is to be sown and dug in, but I should hesitate to use it immediately before planting Gladioli. The ideal is cow manure for light, dry soil, horse manure or sheep manure for that of heavier character. Hop manure is also quite good for heavy land. The question of liming may require consideration. I have found chalk beneficial on a very dry soil, whilst ground lime is best for a stubborn clay. My plan when liming is necessary, is to first dig in the manure, then spread lime over the surface, and leave for ten days or so before raking down ready for broadcasting Mustard or drilling Lupins or Tares.

Assuming that the foregoing instructions have

been carried out, the surface will, on a fine dry day in February, be in a nice friable condition. A good strong hoe should now be used to work this surface to a depth of about 6 inches, after which it will rake down ready for drawing drills. If a considerable area is to be planted



PLANTING GLADIOLUS.

it is highly desirable to divide the plot into beds, 5 feet being a convenient width with paths 2 feet wide. Across the beds draw drills not less than 3 inches deep on heavy soil, or 4 inches if the soil is very light and sandy. If large bulbs are to be planted allow a foot between them, or if small young bulbs are used, 9 inches will suffice. Press the corm gently into position,

and draw back the soil, finishing off smoothly with the rake.

It will be obvious that this method of planting is suggested for plots of ground to be filled with Gladioli alone. When planting in small groups in the herbaceous border, the modification of the plan will be to prepare the patches and plant the corms with a trowel. It is not a good plan to use a dibber for this task.

The time for planting calls for some consideration. Gladioli, like most bulbs and tubers, will endure a long period out of soil, but not without some detriment to vitality. It was, until recently quite customary to begin planting Gladioli in April, and plant later batches in May. Even yet, a large number of corms are planted when May has far advanced, this being a means of securing late flowers.

To produce really fine spikes, however, late planting is a mistake. Even in the north Gladioli may, except in very bad seasons, be planted in March, and in favoured gardens in the south the third week in February is not too soon to begin. Early flowers are thus secured from some varieties, whilst the later sorts benefit considerably by having a longer season of growth.

It is a matter of considerable interest to note that varieties differ widely in the length of time occupied in growth and development of flower spikes, so much so that by planting half a dozen selected varieties on the same date in the same situation, a successional display may commence at the beginning of July and continue without a break until September. Those varieties which are naturally early, may be flowered in successional batches by planting at intervals of a fortnight from the third week in February to the third week in May, but it is unwise to allow late-flowering varieties to linger out of the ground after the middle of April. Successional supplies in their case are best ensured by planting the earliest batches in a warm, sunny aspect, and a couple of batches at the beginning and middle of April in a cooler, shadier situation, but this should not be quite a sunless spot. When autumn weather is particularly good, and no severe frosts work havoc, late-planted Gladioli may be had all through October and even into November, but the quality of these late blooms will not be of a high order, and it is not advisable to risk choice and expensive varieties for the sake of a few late flowers. Sometimes even

after planting in March a spell of quite severe frost may be experienced. In such an event it will be well to cover the bed with some loose, dry litter, straw, or bracken, to be removed as soon as the frost has disappeared.

Of late years many growers in the southern half of England have tried the experiment of leaving corms in the beds through the winter, and in a great many instances the results have been highly gratifying. Success depends largely upon the character of the soil, a light, porous soil being obviously more suitable for such treatment of corms than a cold, wet clay. The beds must be covered for the winter, but it will not do to mulch thickly with manure, or even to cover with straw or hay placed immediately on the ground. The safest plan is first to cover the bed with loose material, such as gorse, heather, or thorn-hedge trimmings which will lie loosely and allow a current of air to pass over the surface of the soil. Over this loose covering a thickness of several inches of straw or bracken should be laid, and to prevent this covering being blown about, wire netting or old fish netting may be stretched over and secured by pegs around the sides. As soon as danger of hard

frost is past the covering should be removed, and the surface of the soil lightly scratched with a rake. Growth from corms wintered in this manner will not only be early, but strong and robust. The grower whose sole object is production of flowers for market, may take three seasons' crops before lifting the corms, but the exhibitor must be content with two, lifting and sorting the corms after the second year's flowering.

The use of fertilizers at the time of planting has sometimes been recommended, but that practice is one I cannot recommend. Young roots when first emitted from the corms are not strong enough to absorb strong stimulants, nor does the plant require them when only an inch or two of growth appears above ground. Even on soil which is hungry fertilizers will be more beneficial when growth is 6 inches high and thereafter, but if preliminary preparation has been attended to as advised, no chemical stimulants will be required until the flower spike can be felt in its sheath.

Hoeing must be attended to as soon as the growing points of the plants become visible, and the more frequently the surface soil is disturbed

by hoeing the better, both for the purpose of keeping down weeds and for aeration of the soil.

A Word regarding Watering

During severe drought Gladioli, like other plants, should not be allowed to suffer from lack of moisture, but it is frequently almost as harmful to use the hose-pipe or watering can persistently. Over-watered Gladioli assume a very sickly, yellowish appearance in the foliage, and the petals of the flowers lack substance and firmness. Cold, hard tap water applied to a sun-baked soil reduces the temperature of the rooting medium, and causes uneven development of the flower spikes. Sun-warmed water is much better than that direct from the tap. The best plan of all is to give the bed one thorough soaking, and then immediately mulch the whole area. Fresh straw manure will serve as mulching material, but is not really essential, chopped straw, chaff, malt culms, spent hops, or similar loose material will answer equally well, the whole purpose of the mulch being to break the fierce heat of the sun and keep the soil underneath cool and moist.

Supporting the Flower Spikes

For whatever purpose Gladioli are grown it is unwise to allow the weighty flower spikes to sway about in the wind. The damage to buds and blossoms, and the constant leverage upon the corms and roots, especially when the soil is of a light, loose character, will nullify half the advantages of otherwise good culture.

For small groups in the flower garden a bamboo cane for every spike is a simple proposition, but for large plantations grown on commercial lines the cost of canes and labour involved is too great, nor is it necessary, if the corms are planted, as they should be, in straight rows.

Stakes should be driven into the soil at reasonable intervals along the rows, and a strong cord drawn tightly and fixed securely at a height averaging an inch below the lowest blossom. It is a simple matter to pass along the rows, draw the stems to the cord, and secure them with raffia. At the same time it is far less trouble when cutting to release the spikes than when tied to sticks or bamboo canes. The single tie for each spike is sufficient when cords are used in the manner suggested, but when stakes are

used, a second tie is necessary at about three-quarters of the way up the flower spike, the raffia being deftly slipped between a pair of

STAKING GLADIOLI.

The left-hand stake is too far from the plant, the stake is too short, and the spike is in danger of ruin, either from beating against the stake or snapping its stem at the point of restraint.

buds. The difference in these two methods is thus explained. When the wind blows against rows of spikes fastened to a cord the cord will yield to pressure, and the flower spikes will bend

to allow the wind to pass, no harm resulting, but if a rigid stake holds a spike by one tie below the flowers the top of the spike will sway about in the wind, beating its flowers and buds against neighbouring spikes and flowers, and very likely snapping at the point where the tie holds it when a sudden strong gust of wind catches it with full force.

Staking Gladioli in the Flower Garden

The method of supporting the flower spikes already described is suitable for long rows, but where groups or beds of flowers are grown for garden adornment it is reasonable to devote more time and care to staking, a task which is unfortunately so often done in a clumsy, and unsatisfactory manner.

Gladioli do not belong to the class of flowers that may be upheld by a string passed round three or four stout stakes. In the first place the growth and foliage will not conceal ugly stakes, and furthermore the spikes within an encircling band of string would flog each other when blown by the wind, and the petals would be badly bruised. Slender bamboo canes placed behind the spikes will be satisfactory if only the

precaution is taken to prevent the upper portion of a spike beating against the top of the cane.

Where flowers are grown for exhibition it is quite legitimate to use canes tall enough to reach the top of the spike, and to tie first just below the bottom bloom and again, with a neat strand of raffia about three-quarters of the way up the spike. By this means the spike is held secure, and is kept straight, a necessary detail in exhibition spikes. The effect thus produced is rather stiff and formal for effective garden display, and both from that point of view, and for the sake of rendering the stakes as inconspicuous as possible it is far preferable to use the twisted wire stakes with split ring ends which may be thrust into the soil so that the "grip" just takes the stem at about half-way up the budded length. These stakes, known as the Willmot Rival plant stakes, are slender but strong, and as they are painted green they are very inconspicuous.

For whatever purpose Gladioli are cut the flower stem only should be severed, leaving every blade of foliage on the plant, for removal of foliage will weaken the corm and spoil next season's bloom.

Lifting the Corms

On heavy, wet soil it is advisable to lift the corms soon after they have finished flowering, otherwise a deal of damage may result from the rotting of the outer skin, and decay of the base of the corm. On light, porous, and well-drained soil no harm will be done if lifting is delayed; in fact, as already mentioned, it has of late years been found beneficial on some soils to allow the corms to remain in the ground all winter, with necessary protection against frost. When lifted, the corms should be tied in bunches by the stems, and hung in an airy shed to dry off. Do not remove foliage or stalks so long as sap and any sign of green colouring remains. It is quite soon enough to clean the roots when everything about them has completely dried.

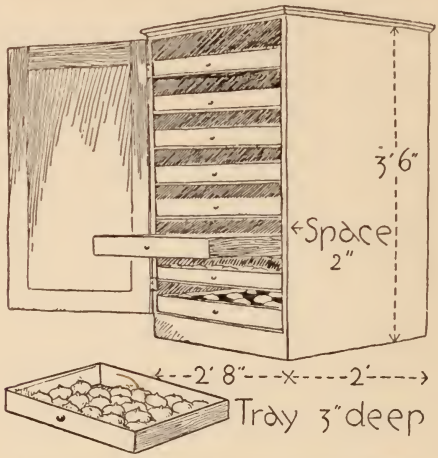
Cleaning then consists of removing foliage and the base of the flower stalk, which will generally fall away from a well matured corm. A stubborn stalk must not be forcibly pulled away, but cut off neatly just above the crown. Loose, broken skin may be removed, but the new skin which closely covers the corm should be left intact. Under the new corm will be found the old,

withered, and exhausted corm, and this should be pulled away by gentle pressure and discarded.

Probably around this old corm, and the base of the new will be found innumerable bulbils, technically known as "Spawn." Remove these, and either discard them, or if intending to raise new stock read and follow the instructions given in a later chapter. Many corms will split themselves up during the growing season, forming two or three corms of varying size. The largest of these, even though not perfectly round will be quite all right for planting in flowering quarters next season, but the smallest should be put aside and planted in a reserve plot to develop strong corms for the following year. The best method of keeping Gladioli during the winter is to lay them thinly in shallow trays, to be stacked in a rack in a cool dry shed, but secure from frost. The trays should slide on runners a few inches apart to admit a current of air between the trays.

Where large quantities are grown the tray-racks are usually built up in sections, with room to pass with a tray between two sections. For smaller collections it is a capital plan to construct a portable cupboard of convenient

dimensions, with runners along the sides to take the trays. Some portion of the ends of the cupboard should be of perforated zinc for ventilation. Such a plan can be adapted for one's individual needs, but it is infinitely better than leaving



A STORE CABINET FOR GLADIOLI CORMS.

the trays about where corms may easily come to harm or varieties get mixed. A further advantage is that such a cupboard may be stored in a cellar or spare room where a cool temperature may be maintained, and if necessity arises the whole can be conveniently covered to exclude severe frost.

CHAPTER V

GLADIOLI FOR EXHIBITION

TO whatever purposes the Gladiolus may be put it must always be recognized as pre-eminently a flower for exhibition, and one of the finest of flowers in cultivation for that particular purpose. It is a flower of form and magnificence, capable not only of lasting for a lengthy period in good condition but of displaying its charms and qualities to greater advantage when cut and set up to be viewed at close quarters even than when growing in the garden. It is a flower which demands sufficient skill in cultivation to make it an interesting study and a fascinating pursuit, whilst at the same time it presents no difficulties which are insurmountable to the amateur who takes a delight in floriculture. A collection covering a considerable range of variety, and embracing many choice individuals, may be acquired at moderate cost, may be grown in a strictly limited area, and once

obtained may be kept and increased for many years with no more accommodation than an average suburban garden for their summer growth, and a dry spare cupboard in a lumber-room in winter. The flower, in its forms and colours merits close scrutiny, and will be the more fascinating the more its points and features are studied.

The Gladiolus is a flower of wide scope, for keen rivalry may centre round a class for half a dozen spikes of the giant hybrids, whilst a big group embracing various types and varieties will make an imposing display attractive to the general public as well as to experts. The Primulinus hybrids will call forth the artistic skill of the floral decorator, and the classes for new varieties will meet the requirements of the hybridist and plant breeder.

The aspiring exhibitor must first get his soil in the best possible condition, for in his case it is not sufficient to rest content that Gladiolus can be grown in most soils, fine enough for ordinary purposes. He must bear in mind that somewhere a grower who may be a competitor has an ideal soil for the purpose, and that many others have by careful treatment converted what

was originally far from perfect into a very good soil. Badly drained clay soil is about the worst for the purpose, but even this can be mastered by trenching, working a quantity of rough mortar rubble and even broken bricks into the bottom spit, with clean, sharp road-grit, river sand, burnt earth and humus into the top spit.

Still further benefit will accrue from digging the top spit of soil from the narrow alleys between the beds, spreading it over the bed, thus raising their level and allowing much surface moisture to drain off the beds into the sunken paths. Furthermore when the drills are drawn ready for planting, a quantity of sharp, pure silver sand may be placed under and around the corms, an excellent means of preserving them from harm.

The other extreme is a harsh, stony, red gravel such as is frequently found over a chalk subsoil.

Bastard trenching must be carried out here, the chalk being well broken up at the bottom of the trenches, and the top spit of gravelly soil being improved by liberal dressings of manure, followed by two or even three crops of Vetches or Lupins, to be turned in as green manure.

Light, dry, sandy soil simply asks to be enriched and the proportion of humus to be increased. Green manuring again helps, as also spent hops, rotted leaves, trimmings of grass verges (after being stacked to decompose), and manure from stall-fed cattle. Happy is he who has a garden of medium loam, deep, and on sandy subsoil. The one thing for him to ascertain is that it is not alive with wireworm, leather jacket, or chafer grubs which will work havoc among Gladioli corms, and of course make a dead set upon the specially choice and new varieties. If such pests are found to be present steps must be taken to annihilate them the season before planting Gladioli. One good method by which this may be accomplished is to dress the ground with a mixture of freshly slaked lime and commercial naphthalene. The proportion should be 1 pound of naphthalene to 14 pounds of lime.

The two substances should only be brought into contact immediately before use, but must then be thoroughly and evenly mixed. Having dug the land proceed with a box of the mixed powder, an old dessert spoon and a good sized dibber. Make holes with the dibber at every yard, drop in a good spoonful of the powder,

and immediately close in the hole. As soon as the lime and naphthalene mixture comes in contact with the earth a gas is generated, and by covering in the holes the gas is made to permeate through the surrounding soil, and the grubs, etc., will either have to make a hasty escape or will be asphyxiated. If any difficulty is experienced in obtaining these ingredients in fresh and powerful condition one of the advertised soil fumigants may be used in the same way.

Corms must be of first-class quality as well as of choice variety. Small, immature, and badly shaped samples are unlikely to throw flowers equally strong and perfect to those from well developed, perfectly harvested stock. It is not imperative that all should be extremely large, for some varieties never make very large corms, and often the extra large ones throw two or three small spikes instead of one strong one. A sound, solid, even-shaped corm with fine close-setting skin should be one's choice.

Whilst advocating early planting, it is necessary to also advise that some thought be given to dates upon which it is intended to exhibit. One cannot go so far as to say a certain number of weeks must elapse between planting and cutting,

for both seasons and varieties vary, and exert their influence upon pace of development. Broadly speaking July and August are the great months and the best period for exhibiting Gladioli, and early March should see the stock planted that is to produce the flowers for the July shows.

For August shows some of the largest and later-flowering varieties may also be planted in March whilst as the shows extend past the middle of the month so planting may approach the end of March, or even the first few days of April.

It is quite possible in the south to have certain kinds of Gladioli in good form for June shows. They must be of fairly early-flowering habit, and should be planted before February is out.

Locality must of course be considered. There will be a difference of probably a fortnight in the flowering dates for counties bordering on the English Channel and those above the Thames. Nottingham, Leicester, Derbyshire and Cheshire will commence their season ten or twelve days later than Worcester, Berks and Bedfordshire, and the farther north one travels the later the flowering season of Gladioli starts, until in Scotland it is at the latter end of August and through September that the finest displays are possible.

It is of less advantage to plant early in cold northern districts because progress cannot be satisfactory whilst the temperature of both soil and atmosphere remains low. Some northern growers plant in frames, removing the lights as soon as conditions warrant, and that is the only satisfactory method of providing for the July shows. There is this consolation, however, the northern growers can exhibit Gladioli in September of far finer quality than can be pitted against them by the southern growers, this affording substantiatory evidence that late planting is not favourable to development of first-class flowers, a long season of growth being the surer aid to fine development. Gladioli love the sun, and except for a batch planted specially in a partially shaded situation for the purpose of prolonging the flowering season an open, sunny position should be sought.

Rough wind is detrimental, as will be readily understood. If the spikes are not securely staked they will be badly bruised, whilst a rigidly held spike gets the petals of expanded blossoms lacerated because of the resistance offered to the wind. It is largely for this reason that protectors are essential in some districts, but before the

time arrives for using these feeding will demand attention.

When Gladioli are grown for general purposes it is neither necessary nor desirable to use a great deal of stimulating fertilizers. The corms are not really benefited by absorption of highly concentrated tonics, but the grower for exhibition must feed or be left in the lurch. The problem is to feed in such a manner that the size and texture of the flowers may be improved without serious damage being done to the corms. Some substances should be avoided entirely because while they increase size they do not improve texture, but produce a flabby coarseness that will not stand. Sulphate of Ammonia and Nitrate of Soda both belong to this category, and the flabbiness not only enters the petals of the flowers but the corms also, causing them to become over large, soft, and liable to shrivel after lifting and to rot when replanted.

Dried blood in small doses is very effective, especially for the brighter and richer shades of colour, upon which it has a marked effect. It is not a suitable food for whites, creams, or the very delicate pinks, the tendency being for such flowers to become stained and flaked with un-

expected and unwanted tints. One pound of dried blood to thirty gallons of water makes a good liquid manure, and this is the best form in which to use it for Gladioli. The liquid should not be applied while the soil is parched. Water the bed thoroughly with clear water in the evening, and follow with the blood liquor early the following morning. An early hour is advised in order that the obnoxious odour may disappear before the heat of the day. For the delicate tinted flowers my favourite tonic is Wellson's plant food, in fact it is a sound, reliable food for all Gladioli. A 3-inch potful sprinkled evenly over a square yard of soil, and hoed in, will have an excellent effect on the flowers, and does not injure the corms.

The time to apply is as soon as the flower buds begin to appear. A second application may be afforded just about the time the first sign of colour appears in the buds, and that must be the last feed.

Of course if drought pre thevails soil should be well soaked after the plant food is hoed in, for plants cannot absorb dry manure. Some kind of mulching material should cover the bed. Chopped straw, malt-culms or brewers' grains,

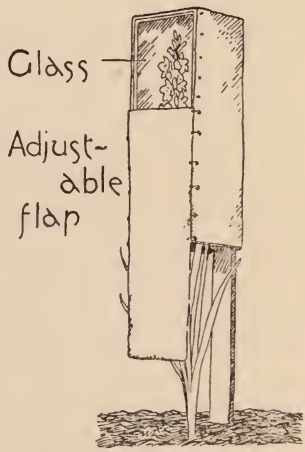
half-decayed leaves, straw shaken out from stable manure, lawn mowings, renewed from time to time, will any of them serve to check evaporation of moisture from the soil, and keep the rooting medium cool.

The Use of Protectors

A Gladiolus protector is a three-sided case of wood which must be long enough to reach from bottom to top of the spike, fixed on a standard to be driven in the ground to the required depth both to bring the cover into position and hold it firm. A groove along the front edges of the side boards will enable a sheet of glass to be slipped down in front of the spike.

At intervals of 3 inches up the front small hooks or flat-headed nails must be fixed to take a muslin curtain, the purpose of which is to slightly shade the lower flowers as they open. Eyelets sewn on the sides of the curtain will enable the height of it to be regulated as each succeeding pair of bells or pips expand their petals. A clear idea of the construction of a Gladiolus protector is conveyed by the accompanying drawing. Protectors serve more than one purpose, the first being to shelter the flower

spike from rough wind. The glazed case helps to hasten the expansion of buds, whilst the muslin curtain hung before the expanded blossoms keeps the latter fresh for a longer period than if they were left fully exposed. The glass front and wooden sides of the case cause the flowers to come forward to the light, improving the appearance of the spike, those left unprotected frequently opening with a wide gap along the centre with pips pointing sideways instead of in a forward direction.



A GLADIOLUS PROTECTOR, the use of which is of great advantage to growers for exhibition.

Points of importance are, the cases should be made of wood, metal being too hot. The outside of the case should be whitened, thus further diminishing the heat of the interior. The dimensions of the case must be ample for comfortable accommodation of a fine spike of bloom, but not unduly large. The muslin curtain should not be of opaque material because a dense shade will weaken colour and substance of petal. The

muslin must be white. Whilst the glass front will serve a useful purpose in hastening the opening of the buds when the weather is somewhat cool it should be dispensed with in hot weather, the muslin curtain alone being used. It is an advantage that the roof or top of the case should slope toward the back, improving top light, and preventing rain from dripping through the joints on to the blooms. In very hot weather the protectors may be turned sufficiently to shade the flowers during mid-day, but under normal conditions it is better they should face the sun for as long as possible. One sometimes hears objection raised against the use of protectors, but it is difficult to conceive any other reason for such objection than that its authors dislike the trouble involved. It may certainly be said that successful exhibition of Gladioli will never be achieved without trouble, if such a task is to be thus described, and after all it is not a disagreeably boring task to attend to the protection and nursing of a fine collection of Gladioli.

A final point regarding the protectors, which may easily be made at home by anyone capable of simple carpentering is that the stake which is attached to the back of the case must not be

a thin rod or round stick, but must be a broad flat board, with a pointed end for driving in the ground. The reason is that the case is necessarily top-heavy, and being several inches wide it would be easily displaced by wind if its only support were a round stake driven into soft, cultivated ground.

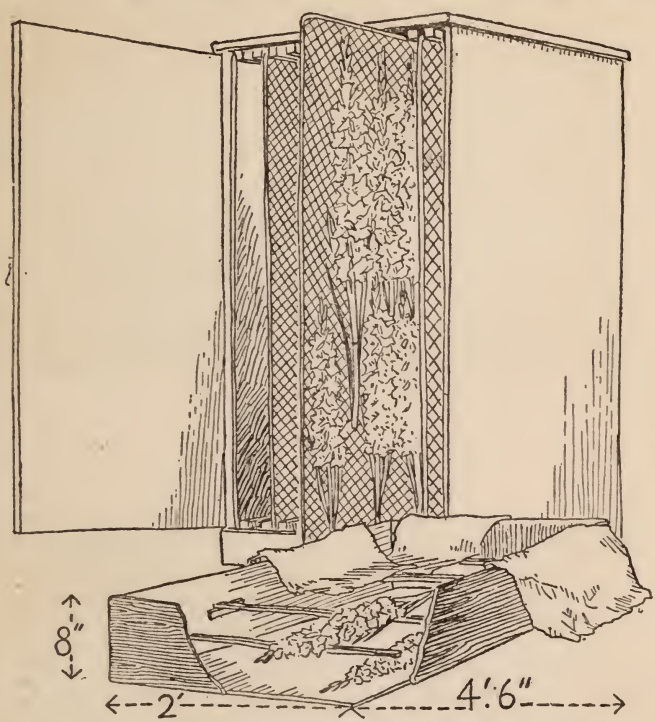
CHAPTER VI

CUTTING, PACKING AND STAGING GLADIOLI

EARLY morning is the best time for cutting the spikes. Take as long a stem as possible, but do not cut foliage, as the loss of foliage is detrimental to the corms. Have a large vessel of water close at hand into which to place the stems as cut. The vessel should be covered with wire netting so that the spikes may be held apart from each other. Get the flowers into a cool, shaded shed as quickly as possible away from both sun and wind.

The best form of packing case is a large box fitted with wire netting racks on light wooden frames to slide along grooves at top and bottom, allowing a space of 6 inches between the racks. The spikes are tied in two places to the meshes of the netting, and may be placed almost touching each other. Some such method is necessary for large, well developed spikes, but the Primulinus hybrids may be laid in flat boxes, or in layers with a light framework between the layers to

prevent damage to the petals. The most unsatisfactory plan is to pack in bunches, especially to stand upright in water. Vibration during



TRAVELLING CASE FOR GLADIOLI.

The wire racks will accommodate many more spikes than are shown in the drawing. They slide in grooves at top and bottom of case. The box below, for packing Gladiolus "dry," is fitted with battens to which the spikes should be tied.

travelling is bound to make the spikes beat against each other, seriously damaging the petals.

If one has to travel so far in hot weather that

it is necessary to pack in water the only satisfactory plan is to have a box deep enough for the spikes to stand erect. A board with holes to take metal tubes must be fixed in the box, and each spike must be tied twice to a bamboo cane reaching almost to the lid of the box. Wedge the base firmly into the tube with moss. Fasten canes across the top of the box to which the end of each stake can be tied to hold it firmly in position. It is an advantage if the front of the box is made loose, to slide in a groove. By this means easy access to the front row is obtained for unpacking.

Methods of Staging

Different equipment and style of staging will be necessary for different classes. Half a dozen or a dozen single spikes of large-flowered varieties may be shown on a board similar to those used for Dahlias and Chrysanthemums, each spike being firmly wedged in a tube, and if adjustable tubes are used the back row may be raised above the level of the front blooms. Jasper vases are sometimes used for single spikes, but unless the stems are carefully mossed so that the spikes stand perfectly erect in the centre of the vases

LACKING SYMMETRY THE BELLS ON THIS SPIKE FAIL TO COVER THEIR FOUNDATION

The Flower is too aged for keen competition

AS AN ITEM IN A LARGE GROUP THIS VASE WOULD BE QUITE USEFUL

Note the use of a small spike to fill in the foreground.

there is some danger of accidents through heavy spikes being overthrown.

The main purpose of single spike classes is to secure supreme quality and superior cultivation. Artistic effect is not the aim. This, however, does not mean that carelessness in staging can be tolerated. The largest and tallest spikes should always be placed at the back, and care should be exercised in arrangement of colours.

Thought should be given to this matter when procuring stock. It is always advisable to have a good range of contrasting colours rather than too many of pink and red shades. White, cream, and yellow are always useful colours to break up the brighter hues, and a dark velvety crimson makes a telling item.

The wider range of types, varieties, and colours in Gladioli has facilitated the adoption of other methods of staging, and at the larger shows classes are provided for collections or groups arranged for effect. These classes afford great scope for production of bold, striking displays. Usually a number of stems of each variety will be required rather than single spikes, and the necessity arises for something better than the ordinary round vases such as jasper ware or

broad-mouthed metal vases. The aim must be to fix every spike so that it shows itself, and neither hides its neighbours from view nor leaves ugly gaps and vacancies between. Massing, to the extent of crowding, is bad showmanship, but Gladioli are essentially big and impressive, and bold staging is quite in keeping with the flower. Big bowls with wire netting covers can be used to good purpose, but perhaps the best of all receptacles are baskets with wide spreading handles, with tins for water fitting in the baskets. By raising a few of these baskets on pedestals and placing others on the stage very fine effects may be produced.

For elaborate exhibits of this nature it behoves the competitor to provide himself with the best possible equipment for staging. Frequently excellent flowers are outclassed because some one comes along with the stands, bowls, baskets and other aids to staging which enable him to make poorer flowers display themselves to very much better effect. Even backgrounds and stage coverings must be carefully studied. A black velvet background is very effective when flowers are staged in a good light, but in buildings which are not well lighted, or in heavy canvas tents, white is of considerable assistance in throwing

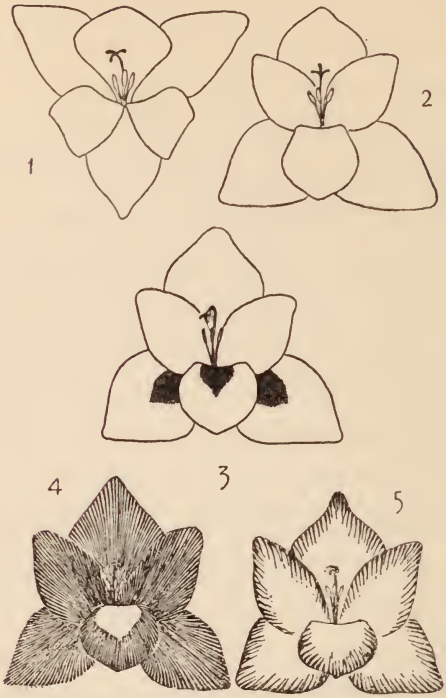
up the colours of the flowers. I have many times used plain white sheeting as a background, and white ceiling paper for covering the stage. The former can be stretched on a light wooden frame, and secured either by curtain rings or tapes, and the fabric can be washed and lightly starched for use at many shows. The paper stage covering is obtainable in rolls, and can be held in position by pressing drawing pins at intervals into the stage boards. It is worth while to exercise some care in arranging such backgrounds, etc., for a badly hung curtain or slovenly laid stage cover will persist in diverting attention from the best items in an exhibit.

At some shows classes are provided for a single basket, bowl or vase of Gladioli, and such classes might well be provided at shows where sufficiently large prizes cannot well be offered to attract exhibits on an extensive scale. In the chapter on the adaptability of cut Gladiolus flowers some hints are given which will be of service to exhibitors in these classes.

Points of Form and Build in Exhibition Flowers

The exhibitor will naturally require to study form and quality in the flowers he

stages. Some extremely big flowers are of bad shape. Petals which spread so wide apart



OUTLINE OF "BELLS" OF VARIOUS LARGE-FLOWERED GLADIOLI.

No. 1. The unusual development of lower petal tends to cramp the bell below. No. 2 is of similar form reversed. and is much more effective on the spike. No. 3 shows perfection of clean blotching. No. 4 the pleasing contrast of a clean white blotch on a full-toned bright or dark flower. No. 5 an ideal "Feather-edged" flower.

that there are distinct gaps between them are not up to exhibition standard. A flower with broad, smooth petals and symmetrical out-

line is more desirable than great size with roughness. Unequal placement of the flowers on the stem, with crowding at one spot and thinness or gaps between the blooms at another cannot compare with ordered regularity and a correct degree of fullness. Some spikes are so elongated that the blooms appear in a single zig-zag row. Such an arrangement compares badly with that of a spike showing blossoms in even pairs, each pair touching without overlapping those above and below, but when one bloom so oppresses its neighbour that it is half hidden and pressed out of shape, the spike should lose points on account of heaviness. It is important that as many bells or pips shall be open as possible, but see that the lowest flowers are not faded. It is better to remove a faded blossom than to leave it on, but at the same time a young spike with a fair length of unopened flowers is better than an aged spike showing traces of the removal of several bells from the base.

By "A fair length" of unopened flowers I do not mean that spikes showing a foot or 15 inches of unopened buds above a pair, or even two pairs, of expanded flowers may be considered exhibition spikes. I mention this because I call

to mind having judged a class where an exhibit was passed, and I was confronted after judg-

DEFECTIVE SPIKES.

Left-hand flowers too widely set, showing central stalk. Right-hand, irregular placement of bells on stem, a characteristic failing in varieties of poor quality.

ing by an irate exhibitor who, armed with a 2-foot rule, proceeded to show me how much

longer his spikes were than the full ones which

DEFECTIVE SPIKES.

Left-hand too heavy, presenting a "lumpy" appearance, sometimes caused by injudicious feeding. Right-hand rough, showing inferior form and coarseness, marking the variety as *not* up to exhibition quality.

had secured the prizes. The breadth across a solitary pair of bells at the base of one spike

greatly exceeded the maximum breadth of the flowers on the winning stands, but as I endeavoured to explain a judge's task is to judge the flowers as they are at the time, not as he may picture they will be a few days hence. One might as well show an unopened rosebud and expect the judge to recognize how fine a bloom it may be the day after the show.

What the exhibitor, and the judge, must consider in an exhibit of a given number of spikes of Gladioli may be summed up thus—First and foremost, quality, which embraces perfection of form both in bell and spike, and clearness of markings. Second, condition, which means development of spike and freshness of flowers. Third, excellence of culture as evidenced by length of spike, and particularly of the expanded blossoms, size of bloom and evenness throughout. Fourth, range and proper disposition of pleasing colours. After that, and as deciding factors in very close competition may be considered such points as smart staging, neat labelling, and the inclusion of a particularly fine new variety or specially good specimen, but one outstanding item cannot compensate for two bad spikes or a generally uneven set.

A REMARKABLY FINE EXHIBITION SPIKE OF SCOTTISH ORIGIN
By courtesy of Messrs. Dobbie & Co., Edinburgh.

For group exhibits the same importance should

A PAIR OF FINE EXHIBITION SPIKES.
Left-hand, a clear "self"-coloured variety. Right-hand, perfect blotching as well as form and build.

attach to quality and condition, but of necessity more importance must be placed upon attractive

arrangement, disposition of colours, and as a deciding factor note should be taken of the range of distinct types and varieties represented in the group.

In the case of individual bowls, baskets, or other artistic arrangements great size is less essential than general effect. It is better, for instance, to use smaller material for the foreground of the arrangement than to cut down big spikes or to use spikes of a uniform size throughout, the latter invariably producing a stilted, stiff, and inartistic effect.

CHAPTER VII

ADAPTABILITY OF CUT GLADIOLUS FLOWERS

THE person to whom the term "light and graceful" constitutes the chief essential in a flower for cutting is unlikely to consider massive spikes of large-flowered gladioli as being first-class material for decorative purposes. Experienced artists, however, can both select a flower for a particular purpose and find the spot or the receptacle to suit a certain flower. In other words, the artist is not bound by the conventional. There are scores of varied circumstances which demand the use of cut flowers, and often the need is for bold, strong and massive effects. Under such conditions the large-flowered Gladiolus is invaluable. It has majesty, strength and size without heaviness, for its spiked form with tapering extremity is a redeeming feature. Colours rich and gorgeous, delicate and dainty, subtle or bold, are provided in endless array, and a valuable characteristic is the

durability of the flower coupled with its ability to open buds for a lengthy period after having been cut.

For public meeting-places, ball-rooms, or banqueting halls, masses of Gladioli will produce striking effects. Upon stairways, balconies, in vestibules, recesses, and for platforms or stages, sheaves or banks of Gladioli are superb, and for church decoration nothing finer could be desired for association with white lilies than such varieties as White Giant, L'Immaculêe, or Glory of Holland. Receptacles have a very great influence upon the effects obtainable from considerable numbers of Gladioli. It is a mistake to crowd several spikes into a narrow-topped vase, the inevitable result being that blossoms will chafe, and hide one another from direct view. Funnel-shaped tubes are unsatisfactory because the spikes are sure to fall to one side, and furthermore the base of the spike is thrust to the narrow end of the funnel where it is surrounded by the smallest volume of water. A broad-bottomed tank-like vessel, not more than 6 inches deep, with a frontal breadth exceeding the distance from front to back affords the best facilities for effective display. The interior of the bowl or

SIX SPIKES ASSORTED, ARRANGED WITH CAREFUL JUDGMENT,
a somewhat difficult accomplishment in a vase.

tank should be fitted with a double grid of wide-meshed wire netting, the lower grid being an inch from the bottom, and the top one an inch below the top of the bowl. By passing each stem through the meshes of both grids the heaviest spike may be held exactly in the position desired. The centre and back spikes may stand quite erect, the rest being placed slightly on the slant outward, thus avoiding appearance of over-crowding. Remember, however, that the Gladiolus is an upright flower, and do not carry the slanting of spikes to the extent of placing them in an almost horizontal position.

Artistic effects are obtainable when a big, heavy metal vase is isolated on a pedestal, and with such containers it is possible to secure stability by filling the bowl with wet sand into which the stems may be thrust, but the sand must be several inches deep or the weight of the flowers will lever them over. Perhaps the best effects are obtained by the use of large baskets with tall arching handles. The basket need not be of too ornate design, nor of bright colour, although a gilded basket certainly does fit the purpose particularly well. One of the advantages of the basket is that the handle may

frequently be pressed into service as a support for one or two extra tall spikes without the existence of support being made obvious. The use of ribbons and bows must be left to the discretion of the artist. Some people have the ability to use ribbons to great advantage, and when they use them one realizes that without the ribbon there would have been just something lacking. On the other hand, some people will stoutly declare that natural flowers have no need of artificial aids or accessories, and whoso presumes to differ from that point of view will assuredly be voted incapable of appreciating natural beauty. Personally I sometimes think the violence of their protestations but thinly veils their own misgivings, and that lest their ribbons should sometimes become an entanglement the safer course of leaving them severely alone is adopted. Dogmatism in regard to art is not always clever, and thus again I would leave this question of ribbons in association with flowers to individual taste, with the suggestion that unless one is wholly satisfied that all is well it is better to dispense with the ribbon entirely.

Great though the decorative value of the older

types of the flower undoubtedly is, the scope of utility of the Gladiolus tribe has been tremendously extended by the development of the

A BASKET OF SMALL GLADIOLUS FLOWERS SHOWING METHOD OF DISPLAY.

A wire grid over a shallow bowl, fitted in the basket, is covered with tufts of mossy Saxifrage.

Primulinus hybrids. The daintiness and charm of these slender-stemmed coy little flowers fit them for purposes for which the giants can never

be used. Table decorations, bouquets, and presentation baskets figure in one's mind, and one visualizes the most bewitchingly beautiful creations that may be carried out in the warm coppery orange shades, the suffused pinks, or cool lemon and amber shades, which are the unique heritage of this twentieth-century flower. Surely with all the types, and the great range of varieties, Gladioli to-day fill the manifold requirements of users of cut flowers to an extent equalled by few flowers and surpassed by none. Indeed, whilst the advantages of the Primulinus hybrids are so great there is small need for entering into detail regarding their adaptability for a wide variety of purposes, for those who are adept in arrangement of flowers need no telling of the wealth of material here provided, whilst even the inexperienced novice can scarcely go seriously wrong with them, because the flowers are so superbly elegant that they fit themselves into presentable order almost without aid.

One point upon which a word may be acceptable is the question of garnishing or foliage accompaniment for the flowers. The fronds of greenhouse ferns do not provide a good setting even for the dainty Primulinus hybrids. Take

note of the character of their own foliage. Unfortunately the removal of that foliage cannot be countenanced by reason of the detrimental effect upon the corms. A capital substitute, however, is available in the foliage of Montbretias which is closely similar in form, and it is an excellent plan to grow a batch of common Montbretias, such as Crocosmæflora or Pottsii, for the particular purpose of providing foliage for use with Gladioli. Gypsophila cannot accentuate the beauty of Gladioli, but rather tends to rob the flowers of dignity.

Slender stems of small-leaved shrubs sometimes combine well with the bright colours, certain barberries, purple-leaved Prunus, the whiteness of Santolina incana, and one or two of the finely-cut Artemisias, or the rather uncommon Perovskia atriplicifolia would be very appropriate companions, and I have seen sprays of Tamarix used to good purpose. Shun the common greenery of the vegetable asparagus, better even use the fronds of the common Brake Fern.

The one flower which makes a perfect companion for Gladioli is Thalictrum dipterocarpum, and with this at command no further search will be necessary.

CHAPTER VIII

COMMERCIAL CULTURE

THE methods to be adopted by the grower for profit must of necessity differ from those which may and should be followed by the amateur and the exhibitor. Whether cultivation of the soil shall be by spade or plough must depend largely upon the extent of operations. Spade work is undoubtedly superior, but if a sub-soiling plough is used good work is possible, and it is a certain fact that large areas of Gladioli are annually planted on ploughed land. The preparatory dressing of animal manure and subsequent green manuring holds good for commercial culture, and in planting, a drill opener, either horse or hand-drawn, may be used. Instead of planting across narrow beds long rows right across the field are best, and by missing a row after every six, alleys will be provided for purpose of access.

The initial outlay upon stock will be an item that must receive cautious consideration. What

are known as top-size and first-size corms cost considerably more than seconds, but whilst it may be an advantage to private growers to secure the larger corms there is not enough advantage to the commercial grower to justify the extra cost, indeed there is considerably more advantage in the additional number of smaller corms procurable for the same outlay. Extra big spikes of bloom are not, generally speaking, wanted in the cut-flower trade, and although some strong corms will throw two spikes it is just as well to have one each from two smaller corms.

It is a good plan, when working up stock of a few first-class varieties which are comparatively speaking expensive, to buy a certain number of flowering-size corms and a quantity of "spawn." The latter, if sown as described in the chapter on raising stock, may be brought on to augment the productive corms for succeeding years, and with liberal treatment a proportion will produce flowers the second year. The original corms will also break up during their first year's growth, and even the smaller young corms from these will make good stock.

Many commercial growers never make any attempt to afford the spikes any support. That,

in my estimation, is an error of judgment. Injured flowers are inevitable, and a large proportion of bent and twisted stems will also depreciate the value of the crop.

It is impracticable to tie the spikes individually, as advised in the case of the private garden, but a serviceable method of supporting large quantities is to drive into the ground at the ends of the rows, and at convenient intervals in the rows, ordinary 3-inch floor boarding, broadside to the row. If the boards are cut to 3 feet 6 inches, one end pointed, they can be driven firmly into the soil to a spade's depth. At about a foot from the ground-line a notch should be cut in both edges of the board, and a similar pair of notches again cut a foot above the first pair. Strings are then run along both sides, resting in the notches, or for safety's sake they may be passed round each board at the notches. These two rows of string stretched tightly along either side of the boards will give a 3-inch channel within which the rising spikes will be held, and although the spikes will sway with the wind, they will, if strong string is used, be prevented from beating against the next row, or reaching the ground.

Feeding

Where large areas are grown application of liquid manure involves too much labour, and the most economical plan is to topdress the soil just as flower stems begin to indicate their presence in the stem with a good fertilizer. Just what constitutes a good fertilizer depends to a certain extent upon the character of the soil, but in a general way a good grade of guano, in which phosphates are more pronounced than nitrogen, will yield good results. It is not to be supposed that Gladioli should not have nitrogen, but the point is that a rich nitrogenous fertilizer tends to produce great size with a tendency to softness. Wellson's Plant Food is safe, easily applied and very effective. It is a favourite topdressing with me.

The benefit of mulching with some loose, light material is specially worthy of the attention of market growers, for it serves the dual purpose of retaining moisture in the soil and of checking the growth of weeds.

Gladioli for the Cut-Flower Market

The commercial grower must make a close study of many details that need not disturb the

amateur. His selection of varieties is one of these important points, for whilst extravagantly expensive varieties cannot be entertained, it by no means follows that the cheapest stock will prove to be the most profitable. The grower for market will not be well advised to grow an extensive range of varieties. Neither market salesmen nor shopkeepers like trifling oddments. Only certain colours are reliably saleable, and wholesale men like large and regular consignments of one sort rather than mixtures. Clear, decisive colours, and clean whites have a firmly-established hold upon the flower-buying public, and there is no lack of these in the Gladioli tribe. Extreme size of flower is not an unmixed blessing from the market grower's point of view, for the very widely-expanding flowers present difficulties in packing, and whilst they must be afforded ample room the very fact of there being space between the spikes constitutes a danger, because in transit the jarring of the boxes will probably cause the spikes to shift, and the petals to be badly bruised.

"Pink Perfection" is a variety which affords an instance of the disadvantage here indicated. It is a remarkably fine flower, and opens a good

number of bells simultaneously, but their breadth is such that even four spikes abreast will scarcely pack in a box 2 feet wide, and by the time they have been jostled in and out of trains and vans the petals are cracked, bruised, and sadly spoilt. Were it not that many buyers are somewhat unreasonable this difficulty, which really is a handicap to some of the finest of Gladioli, could be satisfactorily overcome, and it will, in course of time, be overcome by means of propaganda, a weapon the floral trade handles shyly. All that is required to ensure perfectly safe transit is to cut and pack these very large-flowered varieties before their blossoms expand. The trouble is, the general public are not sufficiently well acquainted with Gladioli to purchase unopened spikes, and a large proportion of shopkeepers will not buy flowers that are not ready for immediate resale. It has been nobody's particular business to tell the public that by buying Gladiolus in the half-opened state they secure a longer enjoyment of fresh, untarnished bloom. Why should the shop assistant trouble whilst she can sell full spikes, even though they are comparatively small, and only second rate! The market grower doesn't get in touch with the retail buyer, and so, un-

fortunately, propaganda work of this kind has been left unhandled. It is not so with continental competitors, and it may be remarked that importations of cut Gladioli have a very considerable effect upon the home trade. I have seen many consignments of Dutch Gladiolus flowers, and have seen under the lids of the boxes messages to the effect that "If these stems are upon arrival immediately placed in warm water, the buds will quickly expand to beautiful fresh blossoms, and later buds will continue to open for many days." That is the kind of message our home growers want, by some means, to thrust before the notice of the whole British public, telling the people also the length of time the flowers remain decorative, and emphasizing a few other points in favour of the use of Gladiolus flowers for bold decorative schemes.

The Primulinus hybrids present less difficulty in regard to packing. Their flowers are smaller, and stems are more wiry, closer packing being consequently possible.

The mistake made with early consignments of these which reached Covent Garden was that colours were mixed and the spikes varied widely

AN EXAMPLE OF "PENCILLED" FLOWERS AS DISTINCT FROM "BLOTCHED" FLOWERS (Kelwayii Strain)

in size. Unnamed mixed seedlings were grown, and being new and unfamiliar they did not excite great interest. We have now some distinctive and very lovely varieties, and if handled properly it is impossible for the cream of the Primulinus section to fail to establish themselves in public favour. Varieties like Alice Tiplady, of a gorgeous flaming orange, Salmon Beauty, with its rich exterior and bright yellow throat, Vermillion Scarlet, one of the most decided colour breaks in the Primulinus tribe to date, and Souvenir, a clear, pure yellow self of reasonable size and delightful form, these are the type of flowers that are wanted for the cut-flower trade, and still a few names may be added, Salmonea, Citronella, Orange Queen, Eurydice, and Sonia all being flowers of strong appeal. Covent Garden is headquarters for the cut-flower trade, and its standing is unchallenged, but it has happened on occasions that the conservative spirit of both London salesmen and buyers have given little heed to a new line until it has caught well hold of Northern markets. That is practically what has happened to Gladiolus Primulinus hybrids, and even whilst early senders to Covent Garden were losing faith in the new race

a few growers of my personal acquaintance were in high spirits over the success of experiments in Northern markets, and were ordering large supplies of fresh stock of some of the very best varieties.

Nor must it be supposed that markets constitute the only outlet for all growers. One of the most successful cut-flower producers of my acquaintance never has a flower to send to market. He built up for himself by personal effort a direct connection among shopkeepers, and by sending his flowers direct to them time and expense are saved, and a personal element exists which he has abundantly proved to be a valuable asset.

It is not a difficult matter for my friend to induce his customers to pay special attention to a new line, nor to convince them that a bold window display of a speciality brings grist to their mill as well as his. The building up of that connection was a task demanding initiative, tact, and perseverance. More than one box of flowers was delivered as a speculation, practical test being what he pinned his faith and confidence upon, and the results have been highly gratifying. The production of Gladiolus flowers

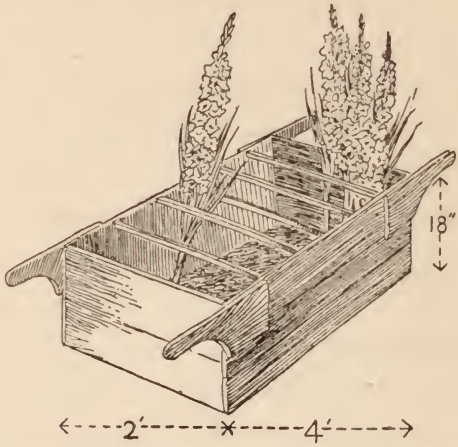
requires new methods of enterprise if it is to be made as great a phase of commercial horticulture as it deserves to be, and if the effort is put into its development the limits of possibility are a distant horizon.

Cutting for Market, etc.

The advantage of cutting the spikes in an early stage of development has already been explained, but when forward flowers are asked for, as they very probably will frequently be, the two points requiring constant attention are that the spikes should be handled and shifted as little as possible, and should never be placed in bundles or one spike over another. Far too often cutters will cut an armful, then place the spikes on the ground while more are cut, gathering the bundles together when retracing their steps along the row. The flowers are often laid in boxes or baskets, and by the time they are packed the under flowers are considerably crushed and all have been handled several times.

In the accompanying illustration is shown an easily-made hand-barrow, consisting of a box with short handles at both ends, and with wooden laths nailed across the top about 3 inches apart. Two cutters can get to work, placing the stems

upright in the box to rest against the laths, and moving the barrow as they proceed along the bed. When full, the load is taken to the packing shed, and the spikes may there be transferred one by one to the packing case. All this may

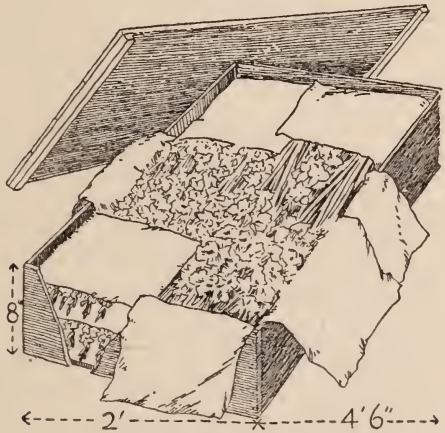


A USEFUL HAND-BARROW FOR USE WHEN CUTTING GLADIOLI FOR MARKET.

appear to be making much of a trifling matter, but it makes for quick work, and the smallest amount of handling, two quite important points.

It is not often practicable to pack for market in boxes with a single layer of flowers, since this involves the use of too many boxes, and increases the difficulties of dealing with "empties." It is very essential, however, that the flowers

in the bottom of a box shall not be oppressed by the weight of the spikes above them. This may be obviated by fixing paper-covered sticks across the box, just clear of the flowers of the first layer, these latter being first covered with tissue paper. The stems of each layer must be



A PACKED MARKET-BOX.

held firmly in position by a stick wedged tightly across them just below the first blooms. Keep all stems straight, close beside each other, but not allowing one spike to cross another, and see that the top row is kept clear of the lid. A ticket should be placed in the top of each box setting forth clear details of the number of spikes contained, and name of variety. It is not a

good plan to pack more than one variety in a box.

In Regard to Varieties

For several years a certain few varieties of large-flowered Gladioli have been so generally grown that one is disposed to the opinion that the majority of growers are prone to take the easier course of following their neighbours' lead rather than seek and test something fresh for themselves. The lilac-mauve coloured America, White Giant, Halley, Willie Wigman, and the scarlet Brenchleyensis have for some years been the most prevalent varieties on Covent Garden market. One treads on tender ground who ventures to criticize the grower for Covent Garden who, we are told, is wide awake to the requirements of the market and stands in need of no advice from outside. There is such a thing as allowing a self-satisfied air to get one's wheels in a rut, and if a home truth can be tolerated there is little doubt that with a large number the "Follow-my-leader" policy sums up the wide-awake knowledge of some market growers, and it is left to a small minority to discover good new lines. Whenever one of this small minority does find something good, depend upon

it the next season will find it on half the stalls in the market. Among the minority who introduce new things to the market, the Danes, Germans, and other foreigners who have settled round Hampton and the Lea Valley are conspicuous. If the subject of varieties is discussed, one is probably told that the buying public controls the supply because they create the demand, and sometimes it is even said that if a certain flower is not prominent on the market that is proof in itself that it is not wanted. Such logic is correct if it applies to a flower that has been well tried, but if a buyer buys America and Halley when other good varieties are not brought to market there is a decided weakness in the argument.

One has only to go through an up-to-date collection of Gladioli to assure himself that there is ample scope for extension of the range of varieties grown for the cut-flower trade, and for the information of newcomers a selection of such varieties is here given.

Captain Fryett. Rosy scarlet, capital form, and fine spike.

Pink Wonder. May be described as a much-improved America.

Odin. Rich salmon, with a distinct, clean-cut blotch.

Crimson Glow. Very rich colour, an American variety of merit.

Red Emperor. A very large flower, but one that has proved itself a good seller.

Purple Glory. Another very large flower, but stout petalled and substantial. Very rich colour.

L'Immaculée. A more refined white than White Giant.

J. B. Walsh. A delicate flesh-tinted petal with a conspicuous blotch of rich fiery vermillion.

Mrs. Bothin. Geranium pink with a flaming centre.

Mrs. Dr. Norton. Cream with clear pink shading.

Majestic. Rich orange yellow with a suffused gleam of bright salmon.

Lord Alverstone. Deep velvety crimson (self-coloured).

A. B. Davis. Clear bright scarlet with conspicuous white blotch.

Goldmine. Yellow.

Butterfly. Primrose with dark yellow lip and red blotch.

A PLAIN BACKGROUND TO DARK VIOLET STAMENS GIVES EMPHASIS TO A STRIKING FEATURE

One might extend this list indefinitely, but I am simply naming a few that are of the type and colours that will arrest attention and that are worth their cost for a fair trial.

It is not suggested that every grower should grow the whole set, but one or two of these or similar varieties might well take the place of too many Halley and America.

CHAPTER IX

GROWING FOR STOCK

THUS far the various phases of flower production, for pleasure or for profit, have engaged our attention, and there are wide differences between either of these and the production of corms on commercial lines.

For the reproduction of a true variety two methods are possible. First, there is the spontaneous breaking up of the mature corm, by which two, three, or perhaps as many as four fair-sized young corms may be secured from one. A proportion of these may be strong enough for immediate sale, but the larger number will require to be grown on a season. These should be planted in the ordinary way, but closer together in the rows, and 2 inches deep if on strong land, and not more than 3 inches on light sandy soil.

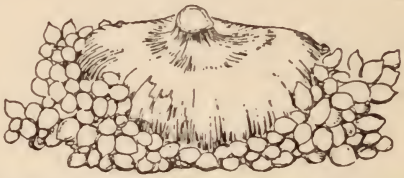
The soil needs to be in good heart, as the result of a season's preparation, but fresh manure should not be used at planting time. If from

any cause it has been impossible to enrich the soil, the best thing is to work in a dressing of Kainit and superphosphate of lime when rough digging during the autumn previous to planting.

Three pounds of superphosphate and 1 pound of Kainit per square rod will make a good dressing. When the drills are to be drawn in spring, first scatter bonemeal over the surface at the rate of 3 pounds per square rod. The opening and re-covering of the drills will mix the bonemeal with the surface soil. It should be unnecessary to stake or support these young plants in any way, especially as it is advisable to cut any flower spikes that form while still in bud. It is not wise to attempt to mature flowers from young stock where a crop of corms is the object in view.

Useful as the stock procurable in this manner will prove to be, it would be too slow a method of increasing stock to be followed as the sole source of production, and the commercial grower puts his chief effort and concern into production of stock from "spawn"—the tiny cormlets or cormels which cluster around the base of large corms. The spawn is separated from the parent corms at the time of cleaning, and will best be stored in boxes, or tins. Bags, either of paper

or canvas, are not good, for the spawn is likely to dry and harden to an extent which will delay sprouting. It is not infrequent that spawn will lie dormant in the ground for a whole season, and from close observation I have satisfied myself that this happens more frequently when the spawn has been stored in bags or when it has been left on shelves exposed to drying atmosphere.



A GLADIOLUS CORM SURROUNDED BY "SPAWN."

It has frequently been urged that in order to hasten growth the cormlets should be "chipped" as is frequently done with Sweet Peas. That is a reasonable proposition when one has a small quantity of spawn from a new or particularly choice variety of which one wishes to secure as much young stock as possible, but when one is dealing with vast numbers, and seeks to produce thousands upon thousands of corms, chipping spawn becomes an impossible task. A more practicable method of encouraging quick sprouting is to sow shallow, secure a comfortably moist

condition of the soil, and then mulch the surface with short-cut straw chaff, buck-wheat husks, or even with a ½-inch coating of gritty sand.

Soil must necessarily be well cultivated, deeply dug for the sake of drainage, cleared of ground pests and vermin which might attack the spawn, brought to a fine tilth, and free from surface stones that would frustrate the efforts of young sprouts to reach daylight, and of course, the whole bed must be kept clear of weeds.

Don't sow spawn too deeply, for that is a frequent cause of failure. An inch is deep enough, and even though early sowing may be deemed a good reason for increasing depth as a safeguard against frosts, be persuaded to keep the spawn near the surface of the soil and cover with loose litter for protection until danger of frost has passed.

Sow the spawn along the drills so that a distance of not less than an inch apart is maintained, and allow 9 inches between the rows. Much spawn is sown a great deal thicker than this, but although growth in the early stages may not be impeded, the ultimate result will be many badly misshapen corms, and the average development of the whole will be inferior to that of a batch which is afforded ample room.

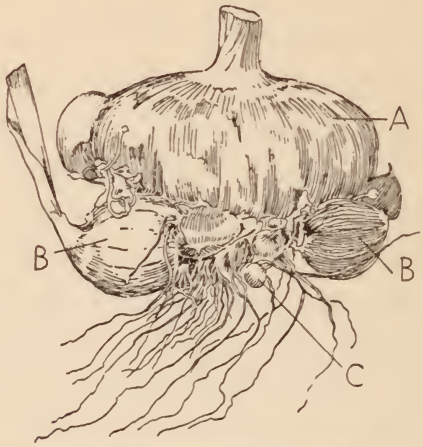
Drought is detrimental to growth, but constant watering with cold tap water is calculated to produce a sickly pallor in the foliage, which is a sure sign of unhappiness. Furthermore, the commercial grower must be ever watchful to reduce to the minimum the costs of production, and large areas cannot be repeatedly watered without incurring considerable expense. The hoe is better than the water can, whilst mulching as already advised checks evaporation, and costs little in comparison with the labour saved.

Lifting the corms presents no difficulties so far as the work itself is concerned, but the important point is to exercise judgment as to when lifting should be done. Whilst growth remains active all is well, but when there is no further growth there will be danger, if the soil becomes saturated, of the outer skin, and possibly the base of the corm, starting to rot. The condition of the roots is the surest guide, and if upon lifting a fair average sample the roots are found to be still plump and fresh looking leave the crop a little longer, but if the roots are withering and losing their grip of the soil, it is advisable to lift without delay.

No foliage or stems should be removed, but simply lift the corms and spread in a convenient

place to dry. An earth floor in a barn or similar building with a weather-proof roof will serve the purpose of a drying shed, free circulation of air without too violent a draught being necessary. Sun will not hurt the corms, but is rather beneficial, so long as exposure to sun does not also mean exposure to sudden rain storms or frosts. When thoroughly dry the corms should be cleaned, removing old roots, stems, and any rough, broken skin, but taking care to preserve the close-fitting skin intact. The storeroom should be a good weather-proof shed from which frost may be excluded without the use of expensive artificial heat. A high temperature is not desirable. If no existing building is available, it is a good plan to adopt a similar style of shed to the usual fruit room, a thick thatched roof being an advantage as affording extra protection against frost. Windows are not essential except that they facilitate work when handling the stock. Any windows, however, should be fitted with shutters for the sake of protection during frosty periods. Permanent rack-fixtures should be erected with runners upon which shallow trays containing the corms may be stacked. Do not store corms in deep boxes, nor in bags.

Grading is essential, the method by which it is done depending upon quantities to be handled. If only comparatively few corms are to be dealt with they should be sorted into sizes as cleaning proceeds, but if large numbers are dealt with



A RIPENED GLADIOLUS CORM.

A. The perfect corm. BB. Small corms to be separated for growing on. C. Spawn, present only in small quantity in consequence of the development of BB.

sieves with smooth cane bottoms will be essential, four grades being generally required for top-size, firsts, seconds, and planting size. Different sets of sieves will be necessary for large-flowered and Primulinus types, and if the early-flowering kinds are grown they also will require a special set. "Planting size," although somewhat vague,

is the term commonly accepted as applying to corms which are below saleable size as flowering corms and require another season in the nursery.

At one time the production of stock from spawn was quite a lengthy process, three and even four seasons being occupied in bringing young corms to flowering size. It is now quite the usual thing to have a large proportion of yearlings strong enough to bloom after one season's growth from spawn, and a second season should suffice to bring the remainder up to productive size.

It has been suggested that this speeding up of development is the outcome of much crossing and re-crossing, which has produced new characters of precocity in the modern Gladiolus. To my mind other factors connected with cultural methods have more influence than changed nature of stocks. Formerly there appeared to be an idea that because spawn is small it must be fragile and tender. Planting spawn was consequently delayed until spring had far advanced. The long period of dry storage hardened the little cormels and made sprouting a slow process. Thick sowing was also in vogue under the impression that it was waste of land to spread such small material over an extensive area. Con-

sequently by the end of the first season the bulk of the cormels had made but little progress, and again the following year the small stock was kept until several weeks of good growth were wasted.

The earlier sowing now practised is of immense advantage, and March should not pass before spawn is under the soil, local conditions, of course, being taken into consideration when deciding precisely whether to sow or to wait awhile.

When working up stock of new varieties from purchased spawn it may happen that despite every attention sprouting is delayed. Do not jump to the conclusion that the spawn is bad, for it may very probably be simply a case of overhardening, as, for instance, when the stock has been grown in the sunny south of Europe or in California, where hard ripening is usual. Sometimes such hard spawn will remain dormant for a whole season. The only thing to be done under these circumstances is to cover the bed and leave the spawn in the ground through the winter. First place a layer of thorny brushwood, gorse or such material, and thatch this with straw, thus affording ample protection whilst at the same time ensuring a current of air which will prevent the surface soil being kept in too wet a condition.

The covering must be removed when spring weather justifies. Generally speaking, growth after a winter in the soil will be particularly vigorous.

Dividing Corms at Time of Planting

Still another method of increasing stock of a choice variety is that of dividing large strong corms.

To do this one must first peel back the skin which covers the top of a corm, using care not to scrape into the solid flesh. If the corm is strong enough it will be found that there are two separate growing points close to the centre, but not actually at the centre. A sharp knife may be passed between these two crowns, and with the blade perfectly perpendicular the corm may be cleanly cut in two equal pieces, each containing one plump crown. Have ready a saucer containing finely powdered charcoal and press the cut surface of the corm into the powder. This will check the discharge of sap. Get the divided corms planted as quickly as possible, surrounding them with clean silver sand before filling in with soil. Under such treatment both pieces will grow away vigorously and produce good flowers, but it will be detrimental to leave cut corms exposed to the atmosphere for any length of time before planting.

CHAPTER X

GLADIOLUS FROM SEED

THE seed of Gladiolus is totally different from spawn, and whilst the commercial grower may find it worth his while to raise seedling stock for sale it will probably be his idea that a few good novelties will evolve which will yield profits whilst the rest of the stock will realize enough to pay routine expenses. This is a more commendable attitude than that seeds should simply take the place of spawn, because the latter involves less labour, and reproduces true stock, whereas the bulk of seeds will produce only nondescript mixtures.

Assuming, then, that the chief aim is to produce novelties, the cultivation of Gladioli from seeds becomes a scientific pursuit, and it may either be followed as a commercial venture or as an enjoyable and fascinating hobby, but whichever it may be the principles governing correct procedure remain the same.

The saving of self-fertilized or chance-fertilized seed is not calculated to carry one to brilliant success. Cross-fertilizing is essential to progress. Nor is this all. The crossing must be made the subject of close and careful study, and with a set purpose in view a well defined line must be pursued methodically and systematically, carefully recording all crosses, and keeping the seeds and produce of each cross separate.

Cross-fertilization of plants has in the past been carried on by many in rather a haphazard manner, but indiscriminate crossing is to be deplored. It may readily be granted that some of our finest varieties of cultivated plants have been produced by the simple method of crossing at random whatever happened to be conveniently available, but the keeping of records of all crosses gives one a clue to the origin of the greatest successes. With information of that character at hand, and with a studied objective in view much time, space and labour may be saved which must otherwise be wasted on that which is bound to be futile.

The very mixed blood of our modern giant-flowered Gladiolus accentuates the difficulties confronting newcomers to the ranks of breeders,

and strange though it may sound to the novice it will be agreed by experienced breeders that the crossing of two of the best varieties in a collection is by no means the surest method of securing a new gem. The farther a variety becomes removed from a clearly defined character the less potent will be the influence of its pollen upon a distinct variety, and in the breeding of Gladioli it will be found that matters are not so simple that the pollen from an extra large flower may be relied upon to improve the size of flowers in seedlings resulting from a cross with a smaller variety. It by no means follows that because the stigma of a pale-coloured variety is fertilized with pollen from a rich velvety crimson some good bright-coloured seedlings will be produced.

It is significant that when the yellow-flowered Gladiolus primulinus species was first distributed in Britain efforts to fertilize it with pollen from the best large-flowered hybrids in cultivation met with little or no success. The pollen of G. primulinus transferred to the stigmas of large-flowered varieties readily fertilized the seed, but when the seedlings grew they leaned very much toward the Primulinus type in the character of growth and stem, and in the size and form of

GOOD FORM IN G. PRIMULINUS HYBRIDS
showing the graceful slenderness which is their distinctive charm.

RECENT NOVELTIES IN PRIMULINUS HYBRIDS
showing tendency to heavier form and closer arrangemen.

flower, the only evidence of the seed-bearing parents being the assumption of new colours, and even in this respect the predominant shade was the yellow of Primulinus. Seedlings from first crosses again took the pollen of large-flowered varieties very reluctantly, but transferred their own pollen to the large-flowered varieties without difficulty. We have now Primulinus hybrids which are several generations removed from first crosses, some which have been inter-crossed with other second and third crosses, and it is becoming noticeable that these inbred varieties, although not very free seeders, do accept more readily the influence of strange pollen.

It is a moot point whether this last observation is a matter for congratulation. The more readily crosses in this direction are effected the more we may anticipate the flattening of petals and general leaning toward the form of the old types. We have now what are termed "Medio-Prims," varieties which have lost something of the Primulinus form, and taken on something of the Gandavensis and Brenchleyensis form. It may be only another step or two to reach what some one will call "Giant-Prims," and it is very doubtful whether that will not be a retrogressive instead

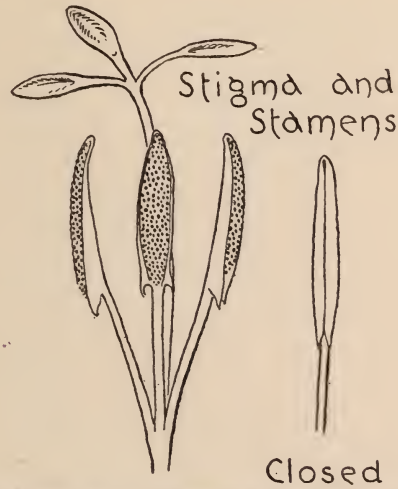
of a progressive step. The real giants have already been evolved by patient labour from the old Gandavensis, Childsii, and other types, and the question may be asked whether any real advantage will accrue from retraversing that ground.

The greater interest, to my mind, would lie in the wake of carefully directed effort to infuse Primulinus blood into our small early-flowering Gladioli such as G. floribundus, G. colvillei, and G. nanus. No great difficulty would be experienced in getting Primulinus in bloom simultaneously with the others mentioned, and the introduction of new artistic shades of colour into these miniatures would be a real boon to floral decorators.

Reverting to the large-flowered race, it is wasted effort to continue crossing and raising seedlings of these with no more definite aim than to see if some new shade of colour turns up. The colours we have are varied enough for all useful purposes. Whatever further development may be attempted should have some set purpose such as the production of a Princeps that will open eight or ten flowers simultaneously instead of only two or three, the cleaning up of muddy or cloudy blotches in otherwise good flowers, the improvement of outline and build in some of the

big but floppy varieties, and the production of more true selfs of clean, telling colours.

Headway is not likely to be made by merely transferring pollen from Pink Perfection to Brenchleyensis in the hope of getting a monster scarlet. It must be a matter of line-breeding,

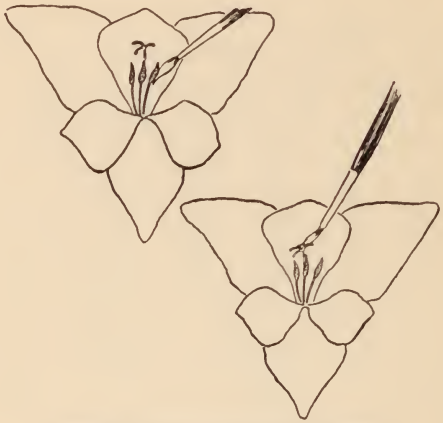


STIGMA (top figure) AND STAMENS OF THE GLADIOLUS FLOWER.

working on the same idea through the second and third generations, and watching closely whenever colour attracts that its acquisition is not at the sacrifice of form, texture, and stamina.

The actual transference of pollen requires but a little tuition and practice. The stigma of a Gladiolus shows plainly by the wide expansion

of its extremity when it is ready to receive the pollen, whilst the pollen is ripe when it will readily attach itself in powdery form to a camel-hair brush. The removal of stamens from flowers selected for cross-pollination is advisable as soon as the flowers open, and it is also prudent to

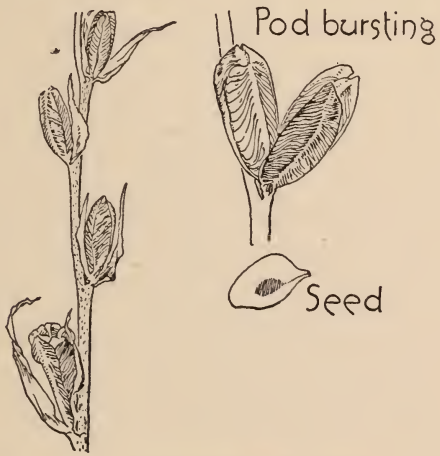


FERTILIZING GLADIOLUS FLOWER.

Left-hand, collecting pollen on a camel's-hair brush. Right-hand, placing the pollen on stigma. The stamens in the bloom to be cross-fertilized should be removed before they open.

place a protector over the spikes that are to be dealt with, using fine tiffany fronts to the cases. It is a good practice to use pollen from the same variety for all flowers fertilized on one stem. This renders the keeping of records easier than when various crosses are made on one spike. Four flowers are quite enough to fertilize on

one spike, and having ascertained that the four have "set" seed the remaining buds should be removed by nipping them from the stalk, but do not cut the upper portion of the stalk away until the seed pods are visibly swelling. When the pods are well set remove the protector but



GLADIOLUS SEED PODS.

provide a stake to which the seed-bearing stem can be secured. The pods attain considerable weight, and should not be left to blow about. Some considerable time will be occupied in developing and ripening seed, but when the pods lose their green colour, becoming a light brown, a close watch must be kept upon them, and at

the first sign of the pods splitting at the top cut the stalk, and place upon a paper-covered tray in some position where they will have the benefit of some sun to complete ripening. This must of course be under cover as protection from rain.

One might continue indefinitely to generalize in this manner, telling what should and what should not be done, helping to a certain extent the beginner to grasp an idea of the nature of the task he contemplates, and pointing out fundamental or serious errors he must avoid, and to that extent providing instruction that may rightly be termed useful, but every plant breeder and seed grower knows there are very many subtle points that can only be learned or discovered and appreciated at their true value after considerable practical experience, and close personal observation.

Almost every successful hybridist breaks away at some point from recognized general principles and strikes out on lines of his own, along which he has to feel his way.

So far as science and practice have thus far travelled neither has discovered any fixed law or system which leads to definite results with mathematical precision. We may indeed be

permitted to ask whether the discovery of any such infallible system would be matter for jubilation.

Mendelism came to the horticultural world as a sensational discovery, and has proved to be of immense assistance to plant breeders, but not even Mendelism has made the creation of new plants a stereotyped process of manufacture, and I for one am not anxious that the further development of Mendelism or any other system shall accomplish so much. Let us continue to feel our way along lines that have been studiously planned, but do not let us confuse that principle with the old idea of trying this and trying that with no regard for objective or method. That is not "feeling the way," but simply floundering about.

There is one point to which I venture to draw the attention of breeders in the hope they may deem it worthy of careful consideration. It concerns the sacrifice of the large proportion of first crosses which fail to show marked improvement, or lack recognized merit. Limits of space compel the destruction of that which is useless, but not all the "wasters," so called, are useless, and I am firmly convinced that in the process of

weeding out, during which the mind's eye is fixed solely on the ideal aimed at, much immensely valuable breeding material is wasted.

For many years I bred pigeons of various breeds for exhibition, and it very frequently occurred that by pairing birds which were hopeless from an exhibition point of view, but the pedigree of which was known, I secured a prize-winner quicker than from the mating of the two greatest winners in my loft.

Many dog-breeders can tell of an ugly pup, given away as useless, becoming the parent of a famous show dog, and breeders of exhibition poultry know that with certain breeds it is the birds which could never themselves win a prize that breed the biggest winners. This is not accomplished by any casual or haphazard methods of mating but by line-breeding to pedigree rather than mating from outward appearance, and it is the application of a similar principle to the breeding of Gladioli that I would advocate. A seedling from a cross of widely differing parents takes on some peculiarity of outward form as a result of the struggling combination of parental characters. The outward form may be displeasing, grotesque, but latent properties may very probably

become dominant in the next generation resulting from (*a*) a second cross with the pollen parent, (*b*) crossing with pollen from the variety that was the seed parent or (*c*) crossing with another seedling of the same parentage. I know a raiser of seedling roses who has three times won remarkable success by adopting a similar method. He has crossed two roses which are the known parents of a popular variety. The cross has given him seedlings unlike either parent, and with no other merit than that of free-flowering capabilities. He has then crossed the seedling with pollen from the popular variety of the same parentage, and from such a cross he has thrice produced varieties which have been accorded a great welcome. Had he continued to repeat his original crosses he might have gone on for years without result of any value in the way of acceptable novelties.

Instead of making so many crosses that it becomes imperative to destroy anything and everything but the striking successes it would, I am convinced, frequently be much better to make few crosses and pursue these to the second and third issue.

CHAPTER XI

SOWING GLADIOLUS SEEDS

MOST books advise sowing seeds of Gladiolus in February, and recommend that they be sown in pans of light soil and placed in a light, airy greenhouse, where a buoyant atmosphere and temperature ranging between 45° and 55° may be maintained. My opinion is that where such facilities are available a great deal is to be gained by sowing the seeds as soon as they are properly ripened. The point I wish to emphasize is that the membranous covering of the seed is thin, and whilst the seed is new is soft and supple. It quickly dries, however, and becomes considerably tougher if either exposed to dry air or enclosed in bags. To keep the seed practically four months—from mid-October to mid-February, for instance—is to subject it to sufficient drying influence to make at least a week's difference to the speed of germination. On the other hand, if sown before October is out the germination

will be rapid and we shall have roots below, and blades above the soil instead of drying seed. Even granting there will be little movement in the seedlings during the second half of December and the whole of January we have root and foliage to start off at a quickened pace at the time of sowing dormant seed in February, and that is a start the latter cannot overtake through the whole season.

I am not in ignorance of the fact that failures have been recorded in cases of autumn sowing, but where such have come before my personal notice it has not been difficult to trace causes.

Seed pods gathered on an October or November day, and immediately opened out can scarcely be claimed to be properly ripened. A deal of superfluous moisture remains in such seed, and it is only fair to allow a short period for evaporation of such moisture before sowing. Compost for autumn sowing should be particularly porous, more so than in spring.

The seeds should be sown thinly as a precaution against damping, but I have seen thick sowings made on the supposition that at the tail end of the year germination will be weak. Various errors, such as irrational watering, spasmodic

changes of temperature, neglect of ventilation, have their responsibilities for failures, and even the unwise course has been adopted of pricking out the tiny seedlings during the most stagnant period of the winter. Unless the grower is prepared to devote special attention to the fragile young stock it is undoubtedly prudent to delay sowing, not until February, but rather until March or April, but if the necessary attention can be given under proper conditions of accommodation the advantage is altogether on the side of autumn sowing for all except the latest seed.

Preparation of compost for seeds is of considerable importance, and by preparation I do not mean simply the mixing of different kinds of soil in varying proportions, that is too generally accepted as being ample preparation.

As to ingredients the requirements are a fibrous loam, not so new as to be spongy, but not so old as to have lost all evidence of fibre, this to form about 60 per cent. of the total bulk. Leaf mould may constitute about 20 per cent., and sharp silver sand 15 per cent., the remaining 5 per cent. being charcoal. There is nothing uncommon about this formula, but the

handling of it is what I want to dwell upon.

No experienced gardener requires to be told that unless he digs a garden and turns up the soil to the sweetening influences of air and frost acidity and sluggishness will cause him trouble. The strange thing is that a gardener who is very particular to rough-dig in autumn, and to do all he can to keep the soil sweet will build up a big stack of loam and let it stay unmoved, except for gradual and imperceptible consolidation for one, two, or three years, and when requiring a compost for seed sowing will excavate the loam from the very depths of the stack, because it is easiest to sift, and will use it immediately, forgetting all about exclusion of air causing acidity.

The proper treatment of loam is to bring out supplies from the stack, spread upon a clean hard floor, exposing to sun, wind, rain, and if possible frost for awhile, and then remove it to an open fronted shelter where it may lie in a loose heap until required for use. As this supply is depleted it should be replenished by similar process from the stack. In this way sweetened loam is constantly available, a very important factor in successful cultivation.

Again with leaf mould, it is a frequent occurrence

to stack the autumn leaves in some secluded hollow into which superfluous water from surroundings drains and becomes stagnant. The leaf mould becomes sodden, sour, and maybe infested with injurious fungoid diseases, eventually causing trouble with seedlings such as damping-off, black-leg, etc. Such leaf mould badly needs sterilizing before use, but really leaf mould should be "made" by keeping the leaves in a heap at a high level, and periodically turning over, sprinkling on at least one occasion lime over layer after layer.

The charcoal used in the mixing of composts for seeds should be broken into fine particles, but not pulverized to absolute powder. Pans for Gladiolus seed should be not less than 4 inches deep. The roots of young seedlings go down perpendicularly to a good depth, and under the soil there should be room for a thick layer of drainage crocks with a covering of moss to keep the finer particles of the compost from trickling down among the crocks. Get the soil evenly and moderately consolidated, with a level surface a little more than half an inch below the rim of the pan. Cover this surface with clean silver sand on which the seeds should be evenly

distributed, allowing no two seeds to touch. Another sprinkling of sand, and not more than an eighth of an inch of compost will complete the sowing. A fine-rosed watercan will serve to settle the soil over the seeds. There is no necessity to cover the pans with paper provided they are not placed where direct sunlight plays upon the soil through the glass.

It is not desirable to place autumn sown seeds on bottom heat, although there is some advantage in doing so with February or March sowings. Maintain a comfortable temperature not below 55° and keep it as regular as possible. Water with a careful hand and watchful eye, and after germination keep the pans near the roof glass.

Don't attempt to prick out until growth becomes fairly active in spring, and then use care to get the little plants at just the right depth, burying but a shade deeper than previous soil line, and ensure getting the roots straight down without a bend. Boxes with an inside depth of 4 inches, with several drainage holes in the bottom, are suitable for pricking out. Allow not less than 2 inches each way between plants. Give them a start in the greenhouse, then shift to a frame where they may be hardened

off prior to planting in a nicely prepared bed in a sunny situation. To separate the plants take the side out of the box, first having ascertained that the soil is well moistened, and carefully draw one plant from another without breaking roots or shaking out the soil. Plant carefully with a trowel, water, and shade for a day or two according to the condition of the weather.

The old idea was that Gladiolus seedlings might flower some time between the age of three and five years. Under the system of treatment here advised a large proportion will produce flowers the first summer, and even March sown seedlings may flower the same season.

Selection of the Cream among the Seedlings

Every raiser hopes for a good proportion of gems among his seedlings, and when the time arrives for selecting the new hand will find himself confronted with many unexpected problems.

Experienced raisers neither need nor take advice on such a matter as this, and my remarks just now are addressed solely to beginners.

When, for the first time, an extensive batch of well bred, well grown seedlings shows a mass

of bloom and colour the raiser cannot fail to be thrilled with an unspeakable delight, but if his ambition is either fame or reward it is now that he treads on the edge of quicksands. He passes along the rows of flowers, and sees here a beauty, there another; this one is a glorious colour, that one is exquisitely dainty, and here is one that is nearly a pure white, whilst another is lovely, although rather pinched in shape, and so through the whole batch. What extraordinary luck with a first batch! but bide a wee, my friend, some questions demand answers. Can you forget for the time being that those seedlings are your own, the product of your own patient and anxious ministrations, and can you, armed with a "standard of perfection" go again to first one and then another of the beauties, the glorious, the dainty, and the lovely ones, and carefully, with cold, calculating eye seek the shortcomings of the flowers as estimated by comparison with the standard of perfection? If you can do this reasons will probably be discovered for discarding some that were first admired, whilst the handicap to some really fine seedlings may be their close resemblance to existing named varieties. Lasting fame or success will not attend

the raiser who distributes too many novelties, the reputation worth building up and maintaining is that which identifies one's name with one or two really first-class varieties of distinctive character each season, and the latest of which is always the best of all. Exercise care in the choice of names. Don't make free with superlatives. "Best of All" looks rather foolish when further progress leaves the variety far behind. "Perfection," although an aim, should be recognized as ever just a little farther ahead, and it is not a wise choice for the name of any variety. Try to strike an original line, and make the names indicate in some way the strain to which the varieties belong, and above all exercise every possible care to avoid duplicating the names adopted by others.

We have, for instance, an English, a Dutch, and an American variety named Marshal Foch or Maréchal Foch.

It is folly thus to set up needless confusion.

A new variety should be shown before distribution, and the Royal Horticultural Society or the Gladiolus section of the National Hardy Plant Society are the authorities whose judgment and approval should be sought. Never show

spikes that are not at their very best. It is even better to let a season pass than to show a flower which is faulty, for first impressions have a knack of lingering in the mind.

When it has been definitely decided to reserve a seedling for naming, label it, make an entry with full description in a stock book, and then cut the flower spike just below the first bloom. It will assist the development of the corm to be relieved of the strain of supporting the blooms, and that is important in the case of quite young stock. There will doubtless be many seedlings which, although not up to the necessary standard for naming, will be suitable for running as unnamed hybrids. These may either be left in mixture or sorted into colour groups such as Pink shades, Yellow Shades, Scarlets, Crimsons, Fancies, etc.

Some American raisers have a large number of groups not only of more or less distinct colouring, but of form. Some are frilled or fringed at the edges, and some are almost circular while others sharply triangular. It is at this point the orthodox florist gets at variance with his fellows. "Form" to him is imperative, and he brooks no licence, ignoring sometimes the fact that the

aim of the commercial grower is to provide that which will please, attract, and satisfy the widely varying tastes of the whole vast public, and to endeavour to awaken and sustain an interest in flowers among thousands to whom the existence of a standard of points in a flower is unknown, and to whom the freakish from the specialist's point of view is more attractive than the model of perfection. Let us beware of carrying our personal fancies to the extremity that makes them savour of bigotry, but pursue the broader minded policy which is calculated to enlist the largest number of recruits to the ranks of amateur horticulturists, some of whom may as they gain knowledge learn to appreciate the greater refinement we have ourselves been schooled to worship.

I was shown not a great while since a Gladiolus that was making effort to produce double flowers. To me it was an abortion, but I was informed that many who had seen it had gone into ecstasies of delight in anticipation that the plant is the forerunner of a new race of large double-flowered Gladioli.

Well, my friends, if some want them and are delighted at the prospect of getting double-

flowered varieties is it prudent that raisers shall say, "We will not let you have them?"

Some will have it that a double flower is unnatural; quite so, but even our exhibition hybrids are not quite as nature made the Gladiolus. I do not advocate that our florists' standard of perfection should be broken down, or trampled in the dust. Let us go on exhibiting the flowers of form, and go on educating the man in the street to appreciation of these flowers, but meanwhile if, for lack of intimate knowledge, the man in the street sees not eye to eye with us, but does see charm in the frilly edged, the quaintly coloured, the double-flowered Gladiolus even, then let us be pleased that he can have what pleases him and what he will grow.

The great thing for ardent horticulturists to strive for is to get the man in the street interested in horticulture, and the great thing for the future of the cult of the Gladiolus is to secure plenty of recruits to the ranks of growers.

CHAPTER XII

POT CULTURE OF GLADIOLI

BOTH early-flowering and the larger and later Gladioli are amenable to pot culture, and when well grown their utility is great. It is beyond question, however, that failures are frequent, and it is in fact but seldom a batch of pot-grown Gladioli equals in quality those grown in the open ground.

Sometimes failure is due to mistakes in potting, but more often the fault lies in the direction of erratic watering and ventilation.

The first essential is to use strong, plump corms. I have known growers to sort over their stock, and set aside the smaller bulbs for potting for the simple reason that they occupy less space.

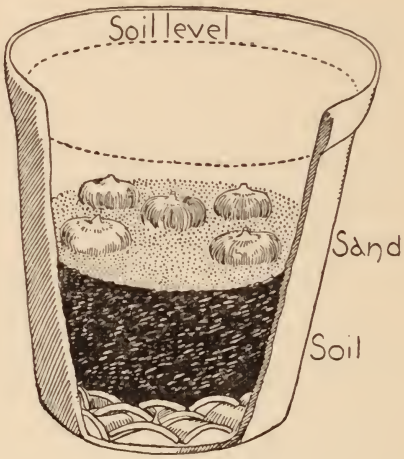
I do not favour the idea that extra large corms necessarily mean specially fine flowers, but I do maintain that it is folly to expect good blooms in pots if only undersized corms are potted.

Early potting is important. Here again it is sometimes assumed that because the plants are to be afforded indoor accommodation, and perhaps artificial heat, a late start can be counterbalanced by a little speeding up during the growing period. That is altogether wrong, because the late start will mean weak root expansion, and without plenty of strong roots no corm can yield good results.

The early-flowering varieties should be potted as soon as ripened corms are available, and that should be not later than mid-October. The usual advice is to pot at intervals between autumn and spring, for the sake of securing successional batches. My contention is that all corms of early-flowering varieties deteriorate if not in soil before Christmas, and I would prefer to have even the latest batch of these potted during December, and contrive to retard flowering by growing on slowly in the coolest quarters available, avoiding, of course, the risk of damage by late spring frosts. There is not a great deal of advantage in having early-flowering varieties very late in the year when both the Primulinus and large-flowering sections are in full swing.

Five-inch or six-inch pots are suitable sizes for

early-flowering Gladioli, each pot to contain five or six corms. The arrangement of drainage crocks is important, for to grow Gladioli well they must have abundance of water, which renders perfect drainage an imperative necessity.



POTTING GLADIOLI.

Simply to throw a handful of broken potsherds into a pot is not providing the best possible drainage. The aim should be to place each piece of crock convex side uppermost with one edge resting on its neighbour's side, so that the whole area of the bottom of the pot is covered, and only a small vacancy is left under each crock. The illustration of corms in a pot shows the

proper formation of the layer of drainage. By placing the crocks in this manner the free passage of surplus water is ensured, while no undue amount of space is taken up which might be occupied by soil.

A thin layer of hop manure may with advantage cover the crocks to prevent the finer particles of soil being washed among the crocks; and that is all the manure that should be used in potting.

The compost should consist of good fibrous loam, not sifted, but chopped down with a spade or pulled to pieces by hand. Such loam may form fully half the bulk of the compost, and to it may be added 30 per cent. of good leaf mould, the remainder being made up of sharp silver sand, pounded lime rubble, wood ashes or charcoal. If the loam is lacking in fibre more sharp sand must be used to maintain porosity.

Compost should be placed evenly in the pots to the half of their depth, and after settling this by a few sharp taps on the potting bench, cover the surface with sand. Take the corms between the thumb and finger and gently press them into the soil until they are about half submerged, then cover with soil and finish off level

about three-quarters of an inch below the rim of the pot. Water with a rosed can sufficiently to moisten the whole of the soil, and leave the pots to drain for a few hours. If a frame is available place it on a hard bottom in a position not fully exposed to sunshine, plunge the pots in ashes, and cover with 3 or 4 inches thickness of old, weathered, sifted ashes. Put on the lights, and prop them up at the back to allow 2 or 3 inches of air space. Here the pots may remain undisturbed for several weeks, during which time they will make a considerable amount of root. It is a wise precaution to surround the outside of the frame with turf, straw, or some dry material to prevent the pots nearest the framework becoming frozen, and mats should be covered over the glass if the weather is severe.

After several weeks in the frame, one or two of the pots should be lifted out for examination. Remove the ashes carefully, and if points of growth are showing above the soil it is time for removal of the batch to a cool greenhouse. For the first few days the pots may stand on the floor of the house, but within a week they should be given a position on a shelf near the glass.

The aim must now be to keep the tempera-

POT-GROWN GLADIOLUS FLOWERS.

Right-hand, showing defective, gappy spike resulting from too close an atmosphere and high temperature. Left-hand, the result of freer ventilation.

ture low, giving plenty of air on fine days. From 40° to 45° is better than a higher temperature until February, but watch that frost does not

reach the pots. Water must be but sparingly given throughout January, but as February advances more water may be given.

If the house is a lean-to it will be advisable to turn the pots round occasionally to prevent the growths adopting a slanting posture. The greatest mistake is to endeavour to force the pace of early growth by use of artificial heat or by keeping the house without free ventilation. Another frequent error is to begin feeding with fertilizers or liquid manure at too early a date. It is when the young flower spikes can be distinctly felt in the centre of the sheathed growth of foliage that feeding may commence, and it is when a little clear stem below the lowest buds can be seen that a gentle rise in temperature will hasten the maturity of flower spikes without detriment.

For liquid manure a good brand of guano may be used, whilst for a dry top dressing a mixture of sulphate of ammonia ½ part, sulphate of potash 1½ parts, double superphosphates 2 parts. Only a small pinch, about the level filling of an ordinary salt-spoon should be allowed to each pot, and it should be evenly distributed round the edge of the pot.

In advising liberal watering it is not intended that the soil shall be kept in a perpetually saturated condition, but that the plants shall never become actually dry, and that when water is given it shall be in sufficient quantity to soak through the whole of the soil. There can be no set rule for watering at stated intervals. The temperature and amount of sunlight has a deal to do with the question, and close observation is the only satisfactory guide.

Treatment of the plants after flowering is of greater importance than might be supposed. Too often interest in plants relapses when the flowers are cut or have faded, but with reasonable treatment there is no reason why pot-grown corms should not retain health and vigour for future growth, provided they have not been submitted to hard forcing. In the first place faded flower spikes should not be permitted to linger on the plants. In the second place, and this is of even greater importance, the soil must not be immediately allowed to become dry and hard. Continue to water regularly for a while longer, in fact, assuming that the flowering finishes in June, watering should go on as before, and even another application of liquid manure should be

given in July. During August there may be a gradual reduction in watering, but not till the end of the month should the restriction amount to drying off.

During this period the pots should be out of doors in an open position, but not so fully exposed to the hottest sun that the benefit of watering is lost in an hour or two.

After the tops have died down turn out the ball of soil and carefully break it up, clean the bulbs, and place them in shallow trays to await the planting season. It is as well that the stock which has been grown in pots shall next season be planted in the open, and the best corms lifted from the open can be potted.

In general principles the pot culture of the large-flowering and the Primulinus hybrids corresponds with the instructions given for early-flowering varieties. Even these I would pot in November, and at intervals between that month and the middle of February. The pots for large-flowering Gladioli should be 7 inches or 8 inches in diameter, those for Primulinus hybrids 6 inches or 7 inches. Again I would urge that under-

BOLD, BRIGHT AND ARTISTIC
The Gladiolus as a Basket Flower

sized corms are not good enough for potting; they must be of good size, firm, and well ripened.

By potting first those large-flowering varieties which flower under natural conditions in July they may be had in bloom without undue forcing early in June. When for purposes of decoration pots of Gladioli are required for July, August and September, it will be a case of bringing them gradually along in a cool, airy place, or even out of doors. That will be found a far more satisfactory plan than potting late. The large-flowered tribe will require staking, but avoid the use of clumsy sticks. The best stake I know for the purpose is the twisted wire stake known as "The Willmott."

Good pots of Gladioli, confined to one variety per pot, are extremely useful for exhibition work, especially for groups arranged in the form of borders or beds of growing plants. It is a moot point whether this method of culture may be commended to the commercial grower for cutting. The probability is it would be more profitable to plant the corms in beds under glass, using the space between batches of young perpetual flowering carnations which have a season's

growth to make before they bloom, or as an alternative to plant the Gladioli and take a catch crop of salads, etc., from the space between the rows.

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